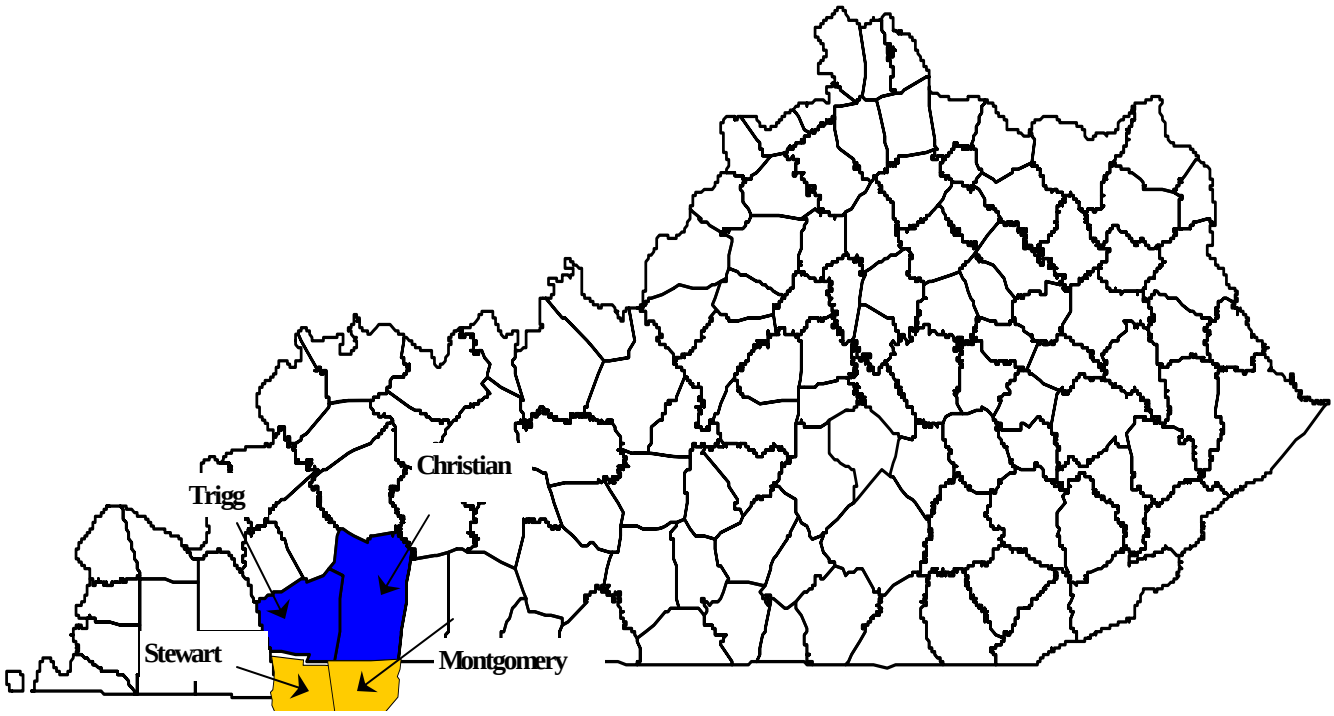
Clarksville, TN-KY, MSA



The Clarksville, Tennessee-Kentucky, Metropolitan Statistical Area (MSA) is ranked 175th in size among the MSAs within the United States. This MSA encompasses four counties, Montgomery and Stewart Counties, Tennessee, and Christian and Trigg Counties, Kentucky.

CHRISTIAN, KENTUCKY

Christian County is part of the Clarksville, Tennessee-Kentucky, Metropolitan Statistical Area (MSA) and is on the I-24 East-West interstate corridor. It is located directly south of Hopkins County, southwest of Muhlenberg County, southeast of Caldwell County, west of Todd County, and east of Trigg County. It is also directly north of Montgomery County, Tennessee, and north east of Stewart County, Tennessee.

Geography/Topography

Christian County has a land area of 721 square miles. The Pennyrile Forest State Resort Park comprises the northwest corner of the county, and the Fort Campbell Military Reservation comprises the southwest county boundary. The south west corner of the county is also divided east-west by I-24 interstate corridor.

Meteorological Information

Wind speed and wind direction data collected by the Division from the Franklin air monitoring site in Warren County for the period 2004-2006 shows that the majority of the time the wind in the area came from the south and south-southwest, and typically at 6-9 miles per hour. (See figure 1) According to the Princeton site of the University of Kentucky Agricultural Weather Center, the average high temperature for July for the area from 2004 through 2006 was 88 °F and the average low was 67 °F. The average precipitation for the same period was 3.68 inches.

Planning

The authority for air quality planning in the Christian County area resides with the Kentucky Environmental and Public Protection Cabinet. Transportation planning for a small portion of southeastern Christian County is performed by the Clarksville Urbanized Area Metropolitan Planning Organization (CUAMPO) and the Kentucky Transportation Cabinet. The Kentucky Transportation Cabinet provides transportation planning for the majority of the county.

Air Monitoring

The Christian County $PM_{2.5}$ monitor (21-047-0006) shows the 3-year average (2004-2006) of the annual 98^{th} percentile of the 24-average is 30.5 micrograms per cubic meter, which achieves the $PM_{2.5}$ 24-hour National Ambient Air Quality Standard (NAAQS - 35 micrograms per cubic meter) and is classified as a county in attainment.

However, because the $PM_{2.5}$ monitor in Montgomery County (47-125-1009), Tennessee has $PM_{2.5}$ 24-hour average values exceeding the NAAQS (35.1 micrograms per cubic meter), information for Christian County is being presented in this document.

The monitoring information for 2006 is complete and the latest available for Christian County, Kentucky, and Montgomery County, Tennessee. (See table 1)

Population

Based on projections to 2006 from the 2000 census data, there are 66,989 persons living in Christian County. (See table 3) That represents approximately 93 persons per square mile. The population of Christian County is approximately 72.6% rural with 27.4% of the people living in incorporated areas. The largest cities in Christian County are Hopkinsville and Oak Grove.

Christian County's population from 2000 through 2006 *decreased* by approximately 7.9% (72,265 to 66,989). The population in the county is expected to increase overall by 16.4% between 2000 and 2015. (See table 2)

Based on 2006 population data for the Clarksville, TN-KY MSA, Christian County represents approximately 27.4% of the total population in the MSA and 83.3% of the Kentucky portion of the MSA. (See table 3)

Air Emissions

The emissions presented in this document are in tons per year (tpy) from the VISTAS BaseG 2002 modeling inventories. (See tables 4 through 8)

Point Sources

Point source VOC emissions from Christian County were estimated at 584.4 tpy in 2002, which represents approximately 43.3% of the total 1349.3 tpy of the overall VOC point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-1)

Point source NO_x emissions from Christian County were estimated at 116.9 tpy in 2002, which represents approximately 0.2% of the total 50,426.9 tpy of the overall NO_x point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-7)

Point source SO_x emissions from Christian County were estimated at 72.5 tpy in 2002, which represents approximately 0.4% of the total of 18,091.5 tpy of the overall SO_x point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-13)

Point source $PM_{2.5}$ emissions from Christian County were estimated at 131 tpy in 2002, which represents approximately 8.6% of the total 1518.6 tpy of the overall $PM_{2.5}$ point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-19)

Point source NH_3 emissions from Christian County were estimated at zero tpy in 2002 of the total 106.8 tpy of the overall NH_3 point source emissions from the Clarksville, TN-KY MSA in 2002 . (See chart CLK-25)

Point sources located within Christian County are subject to PSD requirements with New Source Review (NSR), non-CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants (HAPS), and New Source Performance Standards (NSPS). Also 401 KAR 50:012 applies to sources statewide, requiring that "all major air contaminant sources shall as a minimum apply control procedures that are reasonable, available, and practical." Additionally, any controls imposed as a result of previous nonattainment designations are required to remain in Christian County.

Onroad Mobile

Onroad mobile source VOC emissions from Christian County were estimated at 2106.7 tpy in 2002, which represents approximately 28% of the total 7535.3 tpy of the overall VOC onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-2)

Onroad mobile source NO_x emissions from Christian County were estimated at 2781.7 tpy in 2002, which represents approximately 32.3% of the total 8605.5 tpy of the overall NO_x onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-8)

Onroad mobile source SO_x emissions from Christian County were estimated at 117.4 tpy in 2002, which represents approximately 34.2% of the total 343.6 tpy of the overall SO_x onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-14)

Onroad mobile source $PM_{2.5}$ emissions from Christian County were estimated at 48.2 tpy in 2002, which represents approximately 33.5% of the total 143.6 tpy of the overall $PM_{2.5}$ onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-20)

Onroad mobile source NH_3 emissions from Christian County were estimated at 94.1 tpy in 2002, which represents approximately 36.3% of the total 259.4 tpy of the overall NH_3 onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-26)

Based on information obtained from the Kentucky Transportation Cabinet, commuting traffic from other counties into Christian County is 42.8% and classified as high. The commuting traffic from Christian County into other counties is minimal at 12.5%.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

Nonroad Sources

Nonroad mobile source VOC emissions from Christian County were estimated at 336.1 tpy in 2002, which represents approximately 10.9% of the total 3083.6 tpy of the overall VOC nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-4)

Nonroad mobile source NO_x emissions from Christian County were estimated at 968.9 tpy in 2002, which represents approximately 25.7% of the total 3773.5 tpy of the overall NO_x nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-10)

Nonroad mobile source SO_x emissions from Christian County were estimated at 83.5 tpy in 2002, which represents approximately 17.2% of the total 485.8 tpy of the overall SO_x nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-16)

Nonroad mobile source $PM_{2.5}$ emissions from Christian County were estimated at 68.5 tpy in 2002, which represents approximately 27% of the total 253.2 tpy of the overall $PM_{2.5}$ nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See CLK-22)

Nonroad mobile source NH_3 emissions from Christian County were estimated at 0.5 tpy in 2002, which represents approximately 29.2% of the total 1.8 tpy of the overall NH_3 nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-28)

Area Sources

Area source VOC emissions from Christian County were estimated at 3041.5 tpy in 2002, which represents approximately 44.2% of the total 6885 tpy of the overall VOC area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-3)

Area source NO_x emissions from Christian County were estimated at 1355.5 tpy in 2002, which represents approximately 62.6% of the total 2166.9 tpy of the overall NO_x area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-9)

Area source SO_x emissions from Christian County were estimated at 1248.2 tpy in 2002, which represents approximately 45.7% of the total 2730 tpy of the overall SO_x area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-15)

Area source $PM_{2.5}$ emissions from Christian County were estimated at 978.9 tpy in 2002, which represents approximately 38.5% of the total 2541.9 tpy of the overall $PM_{2.5}$ area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-21)

Area source NH_3 emissions from Christian County were estimated at 1531.8 tpy in 2002, which represents approximately 65.3% of the total 2345.3 tpy of the overall NH_3 area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-27)

Comparison of Total Emissions

A comparison of total emissions across the entire Kentucky and Tennessee area of evaluation was performed using the 2002 VISTAS BaseG Emission Inventory data.

Charts CLK-5 and CLK-6 provide a comparison of VOC emissions across the entire region.

Charts CLK-11 and CLK-12 provide a comparison of NO_x emissions across the entire region.

Charts CLK-17 and CLK-18 provide a comparison of SO_x emissions across the entire region.

Charts CLK-5 and CLK-6 provide a comparison of VOC emissions across the entire region.

Charts CLK-23 and CLK-24 provide a comparison of PM2.5 emissions across the entire region.

Charts CLK-29 and CLK-30 provide a comparison of VOC emissions across the entire region.

Conclusion and Recommendation

Christian County, based on 2004 – 2006 $PM_{2.5}$ monitoring and emissions data, is meeting the 24-hour $PM_{2.5}$ standard with a 3-year average of 30.5 micrograms per cubic meter.

In the Clarksville, TN-KY MSA, Christian County contributes approximately:

- 32.2% of total VOC emissions (18,853 tpy)
- 8% of total NOx emissions (64,973 tpy)
- 7% of the total SO_x emissions (21,651 tpy)
- 59.9% of the total NH_3 emissions (2713 tpy)
- 27.5% of the total $PM_{2.5}$ emissions (4457 tpy)

See charts CLK-6 for VOC, CLK-12 for NO_x, CLK-18 for SO_x, CLK-24 for $PM_{2.5}$, and CLK-30 for NH_3.

Based on data analysis done by ASIP and VISTAS, the pollutants of most concern regarding $PM_{2.5}$ formation are SO_2 and NO_x and direct PM. Christian County does not contribute a high concentration percentage for either of these precursors, or for direct PM. Predominant wind patterns do not indicate an impact from Christian County on the violating monitors. See annual wind roses included in Figure 1.

The 48-hour back trajectory HYSPLITS for Tennessee and Kentucky have been included in a separate section for all days in 2004-2006 when the 24-hour ambient monitoring concentration for $PM_{2.5}$ exceeded 35 micrograms per cubic meter.

The majority of precursors, NO_x and SO_2, are from Stewart County, TN. Regional proportional comparisons are depicted in CLK-7 and CLK-12 for NO_x and CLK-13 and CLK-18 for SO_2. These comparisons show major contributions from Stewart County, and the largest point source in Stewart County is Tennessee Valley Authority's Cumberland Fossil Plant located on the shores of Barkley Reservoir on the Cumberland River near Cumberland City.

In addition, during 2005, several days of fires in Mississippi and Arkansas impacted $PM_{2.5}$ monitors across Kentucky. Two dates in particular September 10 and September 13 appear repeatedly in the maximum values report (See Table 9) for counties being evaluated for designation under the 24-hour $PM_{2.5}$ NAAQS.

In accordance with 40 C.F.R. 50.14(c)(3)(i), the Kentucky Environmental and Public Protection Cabinet made available the ambient air monitoring data requested for exclusion from National Ambient Air Quality Standard (NAAQS) determination, due to exceptional events. The *REQUEST FOR CONCURRENCE OF EXCEPTIONAL EVENT FLAGS ON $PM_{2.5}$ 2004-2006 DATA: Bullitt, Fayette, Kenton, McCracken and Warren Counties, Kentucky* document details the ambient air monitors operated by the Kentucky Division for Air Quality that were impacted by exceptional events and the $PM_{2.5}$ data requested for exclusion from the NAAQS determination in the years 2004-2006.

The following dates were requested.

Date	Site	Concentration	Event
6/21/2005	21-029-0006	35.1	Local fire/ Missouri fires
6/21/2005	21-145-1004	36.9	Local fire/ Missouri fires
9/10/2005	21-145-1004	39.6	Arkansas/Mississippi Fires
9/10/2005	21-117-0007	52.75	Arkansas/Mississippi Fires
9/10/2005	21-029-0006	39	Arkansas/Mississippi Fires
9/10/2005	21-067-0012	44.1	Arkansas/Mississippi Fires
9/10/2005	21-067-0014	38.2	Arkansas/Mississippi Fires
9/13/2005	21-067-0012	40.8	Arkansas/Mississippi Fires
9/13/2005	21-067-0014	35.1	Arkansas/Mississippi Fires
9/13/2005	21-117-0007	42.1	Arkansas/Mississippi Fires
9/13/2005	21-227-0007	35.1	Arkansas/Mississippi Fires
7/19/2006	21-029-0006	39	Arkansas and Local Fires
7/19/2006	21-145-1004	36.7	Arkansas and Local Fires

The public comment period relating to the exceptional event data was November 1 through December 1, 2007. Kentucky is currently awaiting concurrence from USEPA.

This information is being included here because many times these two September 2005 dates appeared as the highest maximum values for counties in the area of evaluation (see Table 9). Satellite images submitted in the exclusion request to

USEPA show the smoke plume settled widely over Kentucky. Meteorology also indicates very stagnate weather conditions over several days.

These fires were a statewide event, and both September dates have been flagged in the AQS database for all $PM_{2.5}$ sites in Kentucky. Even though the affected concentrations are exceedances, not violations, Kentucky wishes to consider the impact of these fires in Arkansas and Mississippi as exceptional events that made the 2005 $PM_{2.5}$ concentrations higher than otherwise would have occurred. These high values should not be considered indications of any significant contribution from the counties into adjacent areas that may not currently be attaining the 24-hour $PM_{2.5}$ NAAQS (ie., Hamilton County, OH; Montgomery County, TN; and Jefferson County, KY).

The monitoring and emissions data and other documentation presented indicate that Christian County, Kentucky, does not contribute a significant amount of $PM_{2.5}$ or emissions that contribute to $PM_{2.5}$ formation in the Clarksville, TN-KY MSA.

Therefore, Christian County should be designated attainment for the $PM_{2.5}$ 24-hour standard.

TRIGG COUNTY, KENTUCKY

Trigg County is part of the Clarksville, Tennessee-Kentucky, Metropolitan Statistical Area (MSA) and is divided east-west by Interstate Highway 24. It is located to the east of Marshall and Calloway Counties, to the west of Christian County, to the southeast of Lyon County, and to the south of Caldwell County. It is also directly to the north of Stewart County, Tennessee.

Geography/Topography

Trigg County has a land area of 443 square miles and Fort Campbell Military Reservation forms much of the southeastern corner of the county. Lake Barley and its watershed comprise much of the central portion, extending from the northwest border to the state line on the southern county boundary. The larger Kentucky Lake forms the southwestern county boundary.

Meteorological Information

Wind speed and wind direction data collected by the Division from the Franklin, Kentucky air monitoring site for the period 2004-2006 shows that the majority of the time the wind in the area came from the south and south-southwest, and typically at 6-9 miles per hour. (See figure 1) According to the Princeton site of the University of Kentucky Agricultural Weather Center, the average high temperature for July for the area from 2004 through 2006 was 88°F and the average low was 67°F. The average precipitation for the same period was 3.68 inches.

Planning

The authority for air quality planning in the Trigg County area resides with the Kentucky Environmental and Public Protection Cabinet. Transportation planning for Trigg County is performed by the Kentucky Transportation Cabinet.

Air Monitoring

For the 2004 – 2006 monitoring period, there were no $PM_{2.5}$ monitors located in Trigg County.

The Christian County $PM_{2.5}$ monitor (21-047-0006) shows the 3-year average (2004-2006) of the annual 98^{th} percentile of the 24-average is 30.5 micrograms per cubic meter, which achieves the $PM_{2.5}$ 24-hour National Ambient Air Quality Standard (NAAQS - 35 micrograms per cubic meter) and is classified as a county in attainment.

However, because the $PM_{2.5}$ monitor in Montgomery County (47-125-1009), Tennessee has $PM_{2.5}$ 24-hour average values exceeding the NAAQS (35.1 micrograms per cubic meter), information for Trigg County is being presented in this document.

The monitoring information for 2006 is complete and the latest available for Christian County, Kentucky, and Montgomery County, Tennessee (See table 1)

Population

Based on projections to 2006 from the 2000 census data, there are 13,399 persons living in Trigg County. (See table 3) That represents approximately 30 persons per square mile. The population of Trigg County is approximately 78.9% rural with 21.1% of the people living in incorporated areas. The largest city in Trigg County is Cadiz.

Trigg County's population from 2000 through 2006 increased by approximately 6.4% (12,597 to 13,399). The population in the county is expected to increase overall by 17.4% between 2000 and 2015. (See table 2)

Based on 2006 population data for the Clarksville, TN-KY, MSA, Trigg County represents approximately 5.6% of the total population in the MSA and 16.7% of the Kentucky portion of the area. (See table 3)

Air Emissions

The emissions presented in this document are in tons per year (tpy) from the VISTAS BaseG 2002 modeling inventories. (See tables 4 through 8)

Point Sources

Point source VOC emissions from Trigg County were estimated at 15.7 tpy in 2002, which represents approximately 1.2% of the total 1349.3 tpy of the overall VOC point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-1)

Point source NO_x emissions from Trigg County were estimated at 2.7 tpy in 2002, which represents nearly zero percent of the total 50,426.7 tpy of the overall NO_x point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-7)

Point source SO_x emissions from Trigg County were estimated at 0.02 tpy in 2002, which represents zero percent of the total of 18,091.5 tpy of the overall SO_x point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-13)

Point source $PM_{2.5}$ emissions from Trigg County were estimated at 10.9 tpy in 2002, which represents approximately 0.7% of the total 1518.6 tpy of the overall $PM_{2.5}$ point source emissions from the Clarksville, TN-KY MSA. (See chart CLK-19)

Point source NH_3 emissions from Trigg County were estimated at zero tpy in 2002 of the total 106.8 tpy of the overall NH_3 point source emissions from the Clarksville, TN-KY MSA in 2002. (See chart CLK-25)

Point sources located within Trigg County are subject to PSD requirements, non-CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants (HAPS), and New Source Performance Standards (NSPS). Sources are also subject to applicable requirements imposed by the Clean Air Interstate Rule (CAIR), the Clean Air Mercury Rule (CAMR), and the NOx SIP Call. Also 401 KAR 50:012 applies to sources statewide, requiring that "all major air contaminant sources shall as a minimum apply control procedures that are reasonable, available, and practical." Additionally, any controls imposed as a result of previous nonattainment designations are required to remain in Trigg County.

Onroad Mobile

Onroad mobile source VOC emissions from Trigg County were estimated at 460.1 tpy in 2002, which represents approximately 6.1% of the total 7535.3 tpy of the overall VOC onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-2)

Onroad mobile source NO_x emissions from Trigg County were estimated at 746.7 tpy in 2002, which represents approximately 8.7% of the total 8605.5 tpy of the overall NO_x onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-8)

Onroad mobile source SO_x emissions from Trigg County were estimated at 30 tpy in 2002, which represents approximately 8.7% of the total 343.6 tpy of the overall SO_x onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-14)

Onroad mobile source $PM_{2.5}$ emissions from Trigg County were estimated at 13.7 tpy in 2002, which represents approximately 9.5% of the total 143.6 tpy of the overall $PM_{2.5}$ onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-20)

Onroad mobile source NH_3 emissions from Trigg County were estimated at 21.5 tpy in 2002, which represents approximately 8.7% of the total 259.4 tpy of the overall NH_3 onroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-26)

Based on information obtained from the Kentucky Transportation Cabinet, commuting traffic from other counties into Trigg County is 21.4% and classified as minimal. The commuting traffic from Trigg County into other counties is high at 38.4%.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

Nonroad Sources

Nonroad mobile source VOC emissions from Trigg County were estimated at 978.7 tpy in 2002, which represents approximately 31.7% of the total 3083.6 tpy of the overall VOC nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-4)

Nonroad mobile source NO_x emissions from Trigg County were estimated at 448.6 tpy in 2002, which represents approximately 11.9% of the total 3773.5 tpy of the overall NO_x nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-10)

Nonroad mobile source SO_x emissions from Trigg County were estimated at 65.9 tpy in 2002, which represents approximately 13.6% of the total 485.8 tpy of the overall SO_x nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-16)

Nonroad mobile source $PM_{2.5}$ emissions from Trigg County were estimated at 38 tpy in 2002, which represents approximately 15% of the total 253.2 tpy of the overall $PM_{2.5}$ nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-22)

Nonroad mobile source NH_3 emissions from Trigg County were estimated at 0.31 tpy in 2002, which represents approximately 17.4% of the total 1.78 tpy of the overall NH_3 nonroad mobile source emissions from the Clarksville, TN-KY MSA. (See chart CLK-28)

Area Sources

Area source VOC emissions from Trigg County were estimated at 564 tpy in 2002, which represents approximately 8.2% of the total 6885 tpy of the overall VOC area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-3)

Area source NO_x emissions from Trigg County were estimated at 242.9 tpy in 2002, which represents approximately 11.2% of the total 2166.9 tpy of the overall NO_x area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-9)

Area source SO_x emissions from Trigg County were estimated at 300.7 tpy in 2002, which represents approximately 11% of the total 2730 tpy of the overall SO_x area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-15)

Area source $PM_{2.5}$ emissions from Trigg County were estimated at 296.3 tpy in 2002, which represents approximately 11.7% of the total 2541.9 tpy of the overall $PM_{2.5}$ area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-21)

Area source NH_3 emissions from Trigg County were estimated at 423 tpy in 2002, which represents approximately 18% of the total 2345.3 tpy of the overall NH_3 area source emissions from the Clarksville, TN-KY MSA. (See chart CLK-27)

Comparison of Total Emissions

A comparison of total emissions across the entire Kentucky and Tennessee area of evaluation was performed using the 2002 VISTAS BaseG Emission Inventory data.

Charts CLK-5 and CLK-6 provide a comparison of VOC emissions across the entire region.

Charts CLK-11 and CLK-12 provide a comparison of NO_x emissions across the entire region.

Charts CLK-17 and CLK-18 provide a comparison of SO_x emissions across the entire region.

Charts CLK-5 and CLK-6 provide a comparison of VOC emissions across the entire region.

Charts CLK-23 and CLK-24 provide a comparison of PM2.5 emissions across the entire region.

Charts CLK-29 and CLK-30 provide a comparison of VOC emissions across the entire region.

Conclusion and Recommendation

For the 2004 – 2006 monitoring period, there were no $PM_{2.5}$ monitors located in Trigg County.

In the Clarksville, TN-KY MSA, Trigg County contributes approximately:

- 10.7% of total VOC emissions (18,853 tpy)
- 2.2% of total NOx emissions (64,973 tpy)
- 1.8% of the total SO_x emissions (21,651 tpy)
- 16.4% of the total NH_3 emissions (2713 tpy)
- 8.0% of the total $PM_{2.5}$ emissions (4457 tpy)

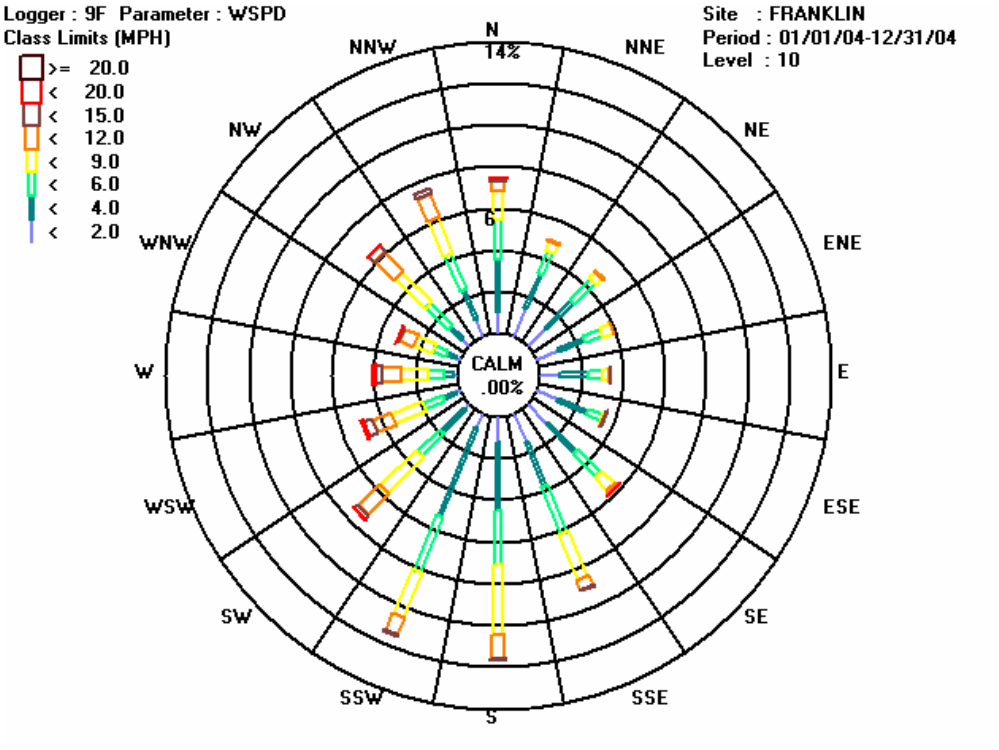
See charts CLK-6 for VOC, CLK-12 for NO_x, CLK-18 for SO_x, CLK-24 for $PM_{2.5}$, and CLK-30 for NH_3.

In Trigg County predominant wind patterns are away from Tennessee and would have the small amount of emissions from Trigg County being transported to the north and away from monitors with violations.

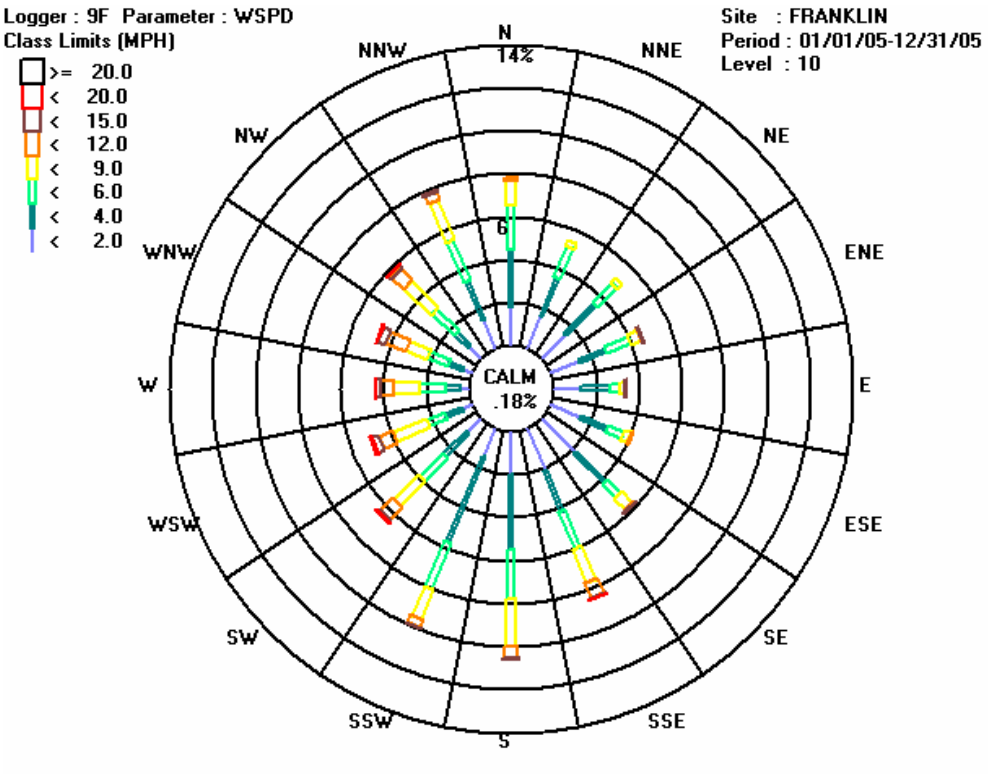
The emissions data and other documentation presented indicate that Trigg County, Kentucky, does not contribute a significant amount of $PM_{2.5}$ or emissions that contribute to $PM_{2.5}$ formation in the Clarksville, TN-KY, MSA.

Therefore, Trigg County should be designated attainment for the $PM_{2.5}$ 24-hour standard.

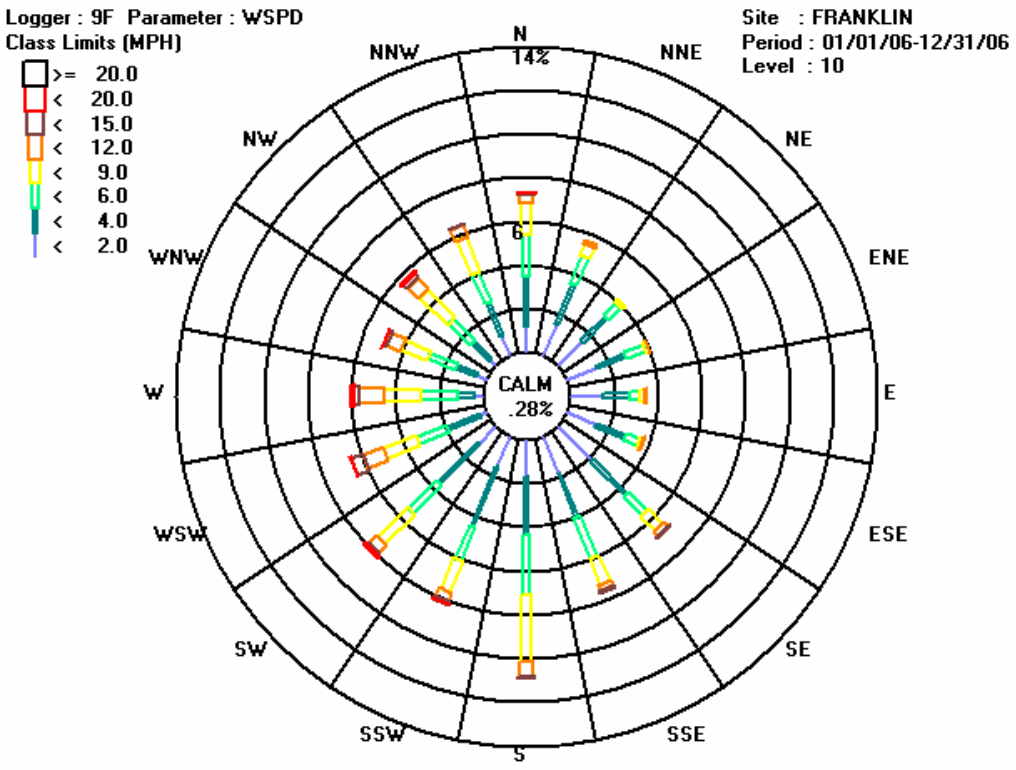
Figure 1
Kentucky Area Wind Rose Patterns



2004



2005


Logger : 9F Parameter : WSPD
Class Limits (MPH)
>= 20.0
< 20.0
< 15.0
< 12.0
< 9.0
< 6.0
< 4.0
< 2.0
Site : FRANKLIN
Period : 01/01/06-12/31/06
Level : 10
N
14%
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
6
CALM
.28%

2006

Table 1
Clarksville, TN-KY MSA
3-year Average* of Annual 24-hour for $PM_{2.5}$
(micrograms per cubic meter)

Monitor	2004	2005	2006	3-year Average
Kentucky County				
Christian	26.2	35.0	30.3	30.5
Trigg	-	-	-	n/a
Tennessee County				
Montgomery	27.9	43.0	34.3	35.1
Stewart	-	-	-	-

* NAAQS 3-year average is calculated using the annual 98th percentile of the 24-hour concentration.

N/A indicates no monitor data for that county.

Table 2
Kentucky Portion of the Clarksville, TN-KY MSA
Population Growth Data

County	Census 2000	2006*	%Growth 2000-2006	2015*	%Growth 2000 - 2015
Christian	72,265	66,989	-7.9%	84,144	16.4%
Trigg	12,597	13,399	6.4%	14,789	17.4%

*U.S. Census Bureau projections to July 1, 2006 and 2015

Table 3
Clarksville, TN-KY MSA
2006 Estimated Population Data

	2006*	% of Total	
Kentucky County		of KY Portion	of MSA
Christian	66,989	83.3%	27.9%
Trigg	13,399	16.7%	5.6%
KY Total	80,388	-	33.4%
Tennessee County			
Montgomery	147,114	91.9%	61.2%
Stewart	12,998	8.1%	5.4%
TN Total	160,112	-	66.6%
MSA Total	240,500		

*U.S. Census Bureau estimated for 2006.

Table 4
2002 VISTAS Clarksville, TN-KY MSA
Total VOC Emissions
(tons per year)

County	VOC				
	Point	Area	Mobile	Nonroad	Total
Christian	584.40	3,041.50	2,106.68	336.12	6,068.70
Trigg	15.68	563.98	460.12	978.69	2,018.47
KY Total	600.08	3,605.48	2,566.80	1,314.81	8,087.17
Montgomery, TN	529.61	3,046.54	4,525.53	739.37	8,841.05
Stewart, TN	219.63	232.97	443.00	1,029.40	1,925.00
TN Total	749.24	3,279.51	4,968.53	1,768.77	10,766.05
Total Emissions	1,349.32	6,884.99	7,535.33	3,083.58	18,853.22

Table 5
2002 VISTAS Clarksville, TN-KY MSA
Total NO_x Emissions
(tons per year)

County	NOx				
	Point	Area	Mobile	Nonroad	Total
Christian	116.89	1,355.45	2,781.65	968.94	5,222.93
Trigg	2.72	242.85	746.73	448.63	1,440.93
KY Total	119.61	1,598.30	3,528.38	1,417.57	6,663.86
Montgomery, TN	288.42	506.65	4,639.84	1,167.52	6,602.43
Stewart, TN	50,018.85	61.90	437.30	1,188.36	51,706.41
TN Total	50,307.27	568.55	5,077.14	2,355.88	58,308.84
Total Emissions	50,426.88	2,166.85	8,605.52	3,773.45	64,972.70

Table 6
2002 VISTAS Clarksville, TN-KY MSA
Total SO_x Emissions
(tons per year)

County	SOx				
	Point	Area	Mobile	Nonroad	Total
Christian	72.50	1,248.22	117.37	83.47	1,521.56
Trigg	0.02	300.71	29.99	65.94	396.66
KY Total	72.52	1,548.93	147.36	149.41	1,918.22
Montgomery, TN	1,335.90	1,040.77	177.71	119.77	2,674.15
Stewart, TN	16,683.08	140.29	18.48	216.60	17,058.45
TN Total	18,018.98	1,181.06	196.19	336.37	19,732.60
Total Emissions	18,091.50	2,729.99	343.55	485.78	21,650.82

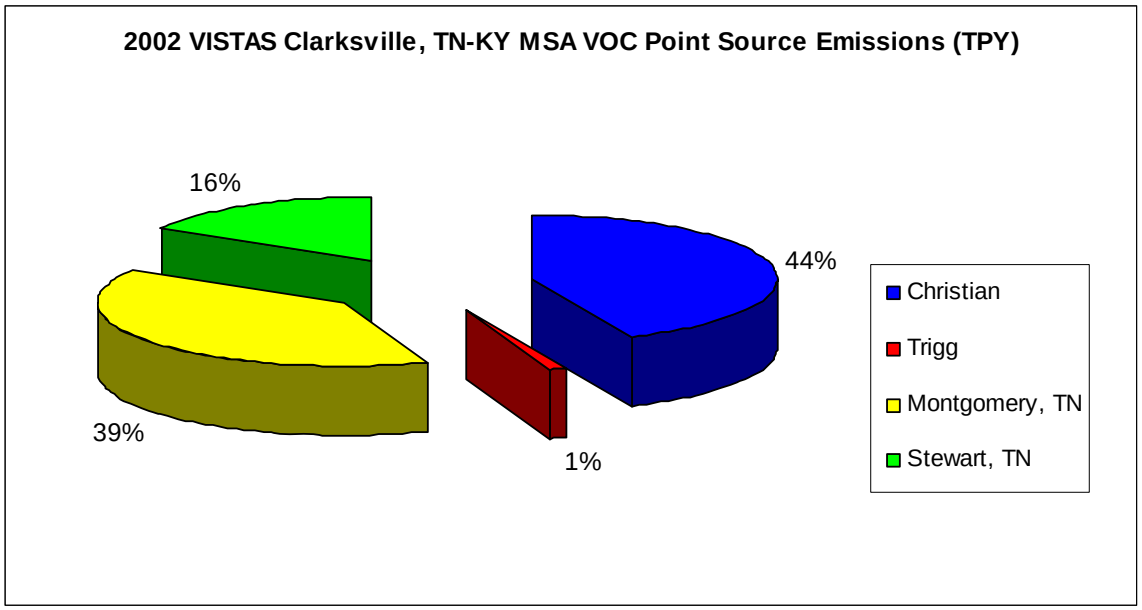
Table 7
2002 VISTAS Clarksville, TN-KY MSA
Total NH_3 Emissions
(tons per year)

County	NH3				
	Point	Area	Mobile	Nonroad	Total
Christian	0.00	1,531.82	94.12	0.52	1,626.46
Trigg	0.00	423.00	21.47	0.31	444.78
KY Total	0.00	1,954.82	115.59	0.83	2,071.24
Montgomery, TN	0.00	345.48	129.59	0.69	475.76
Stewart, TN	106.81	44.97	14.25	0.26	166.29
TN Total	106.81	390.45	143.84	0.95	642.05
Total Emissions	106.81	2,345.27	259.42	1.78	2,713.28

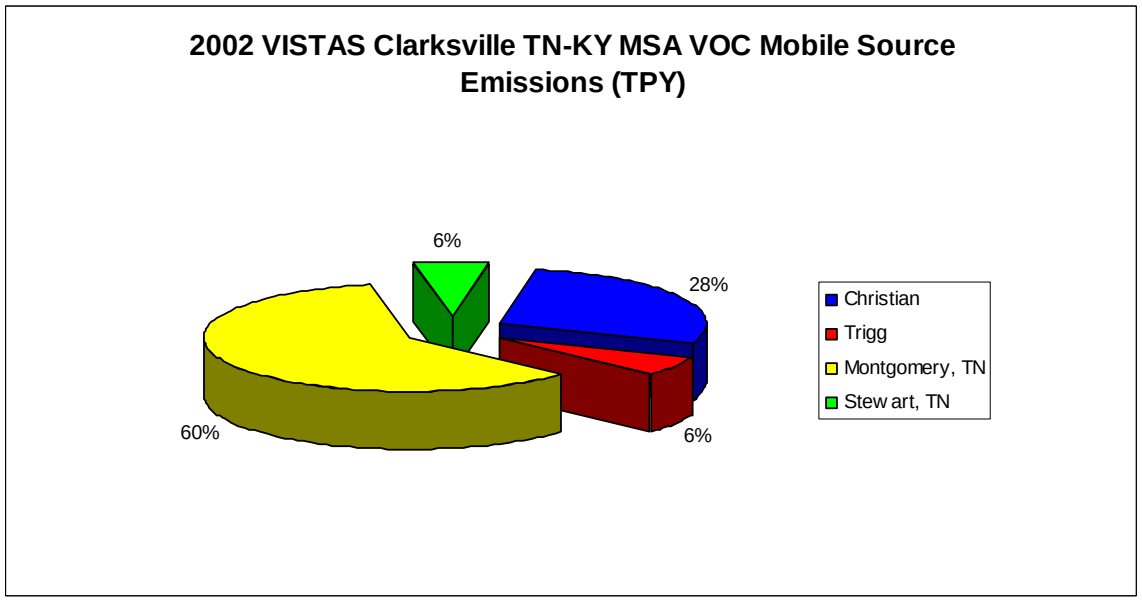
Table 8
2002 VISTAS Clarksville, TN-KY MSA
Total $PM_{2.5}$ Emissions
(tons per year)

County	**PM**				
	Point	Area	Mobile	Nonroad	Total
Christian	131.01	978.90	48.17	68.49	1,226.57
Trigg	10.86	296.27	13.65	37.97	358.75
KY Total	141.87	1,275.17	61.82	106.46	1,585.32
Montgomery, TN	504.04	1,111.23	74.42	83.00	1,772.69
Stewart, TN	872.64	155.46	7.37	63.77	1,099.24
TN Total	1,376.68	1,266.69	81.79	146.77	2,871.93
Total Emissions	1,518.55	2,541.86	143.61	253.23	4,457.25

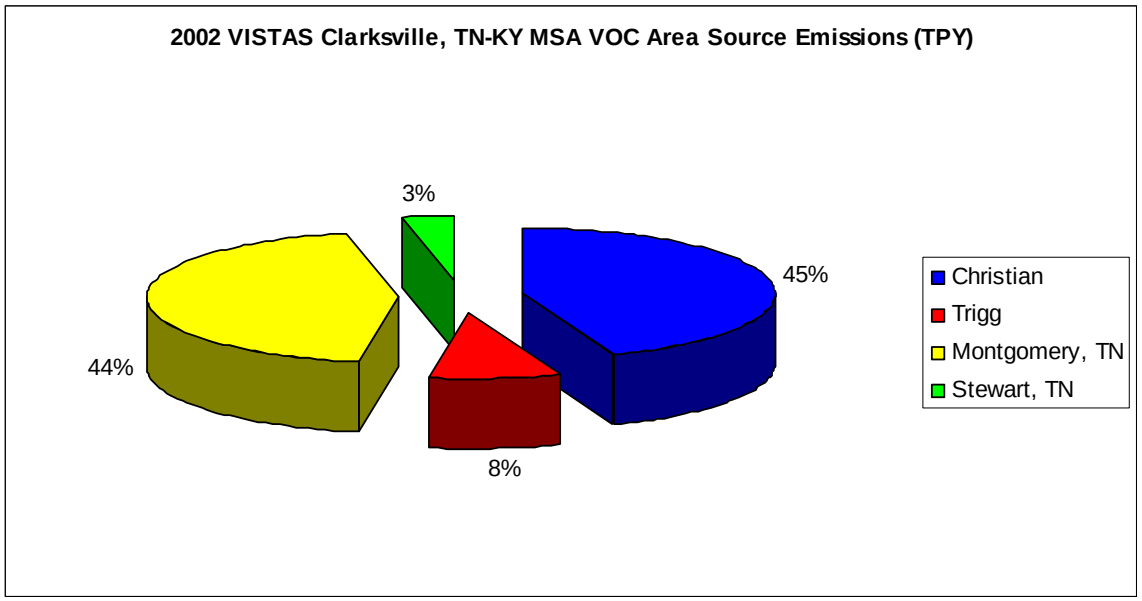
CLK-1


2002 VISTAS Clarksville, TN-KY MSA VOC Point Source Emissions (TPY)
16%
39%
1%
44%
Christian
Trigg
Montgomery, TN
Stewart, TN

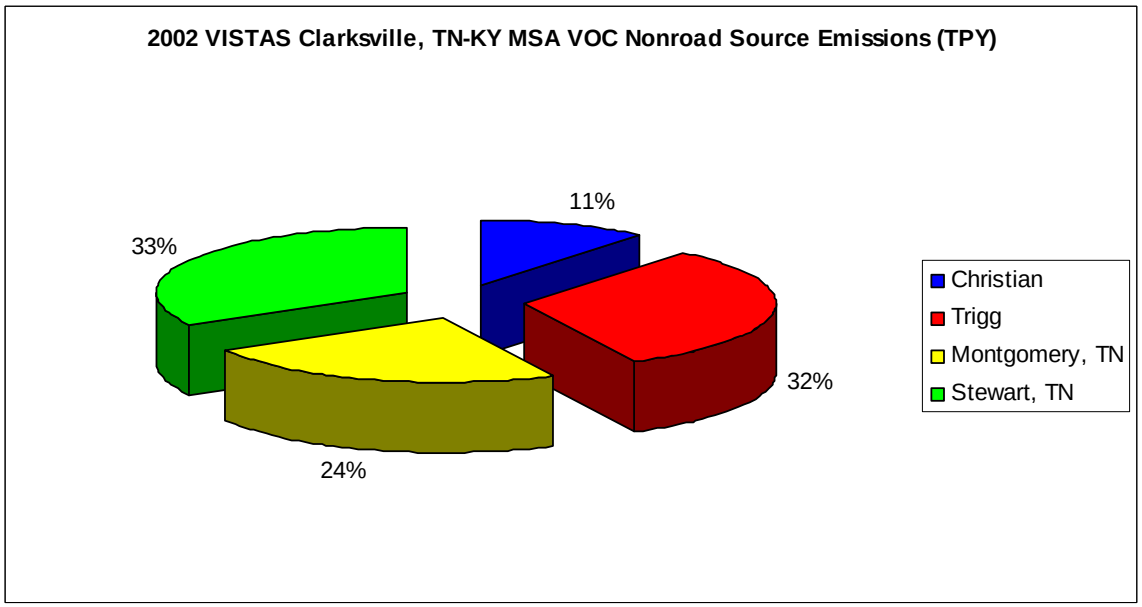
CLK-2


2002 VISTAS Clarksville TN-KY MSA VOC Mobile Source Emissions (TPY)
6%
28%
60%
6%
Christian
Trigg
Montgomery, TN
Stew art, TN

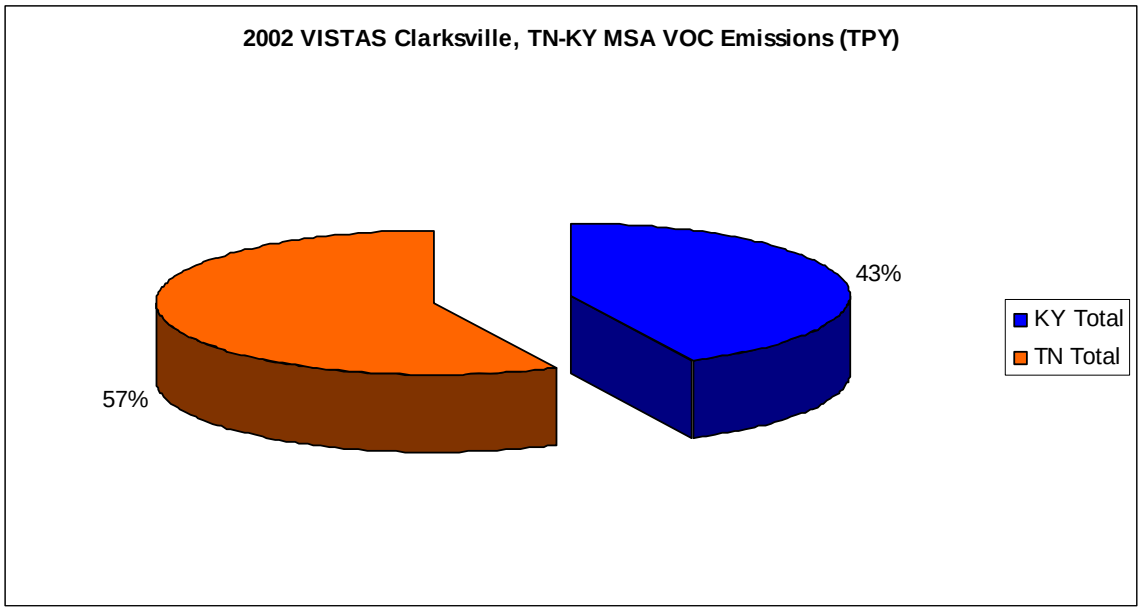
CLK-3


2002 VISTAS Clarksville, TN-KY MSA VOC Area Source Emissions (TPY)
3%
45%
44%
8%
Christian
Trigg
Montgomery, TN
Stewart, TN

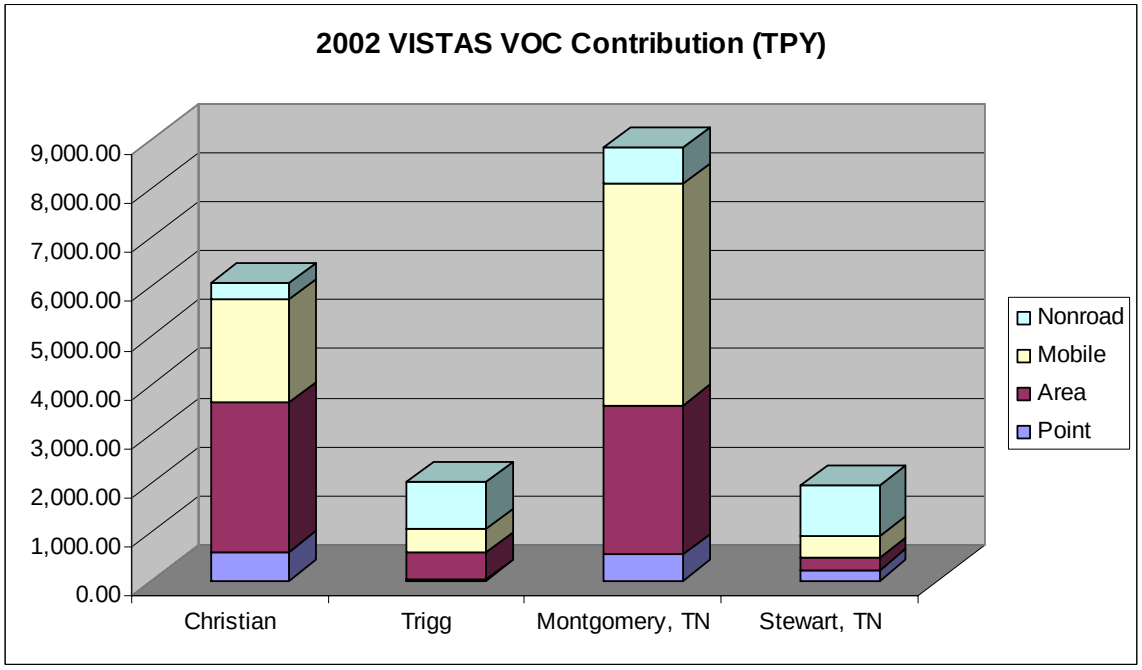
CLK-4


2002 VISTAS Clarksville, TN-KY MSA VOC Nonroad Source Emissions (TPY)
11%
33%
32%
24%
Christian
Trigg
Montgomery, TN
Stewart, TN

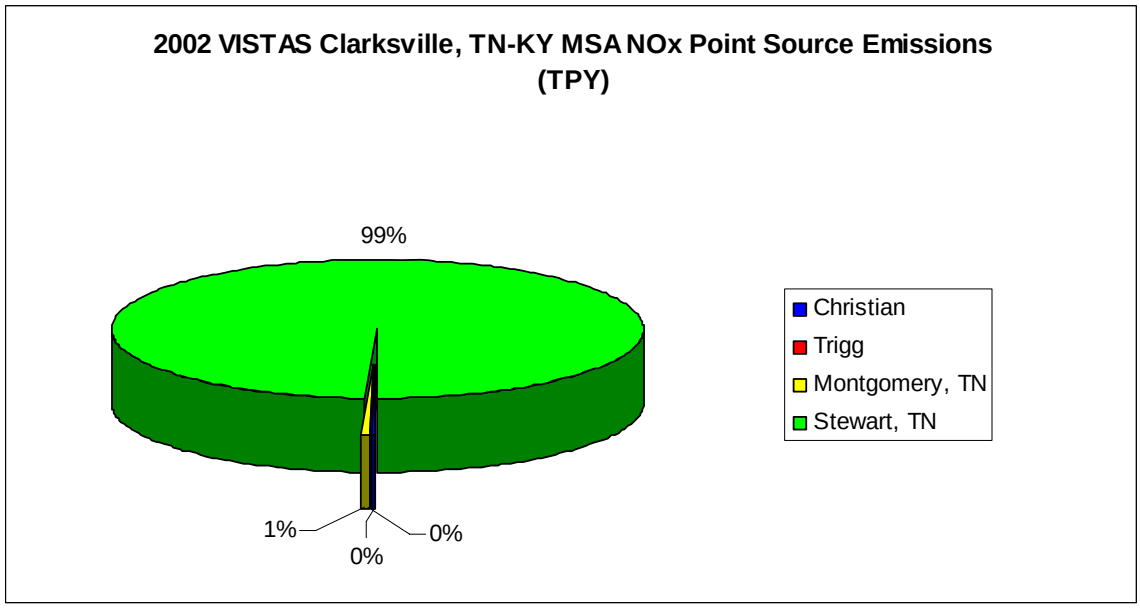
CLK-5


2002 VISTAS Clarksville, TN-KY MSA VOC Emissions (TPY)
43%
57%
KY Total
TN Total

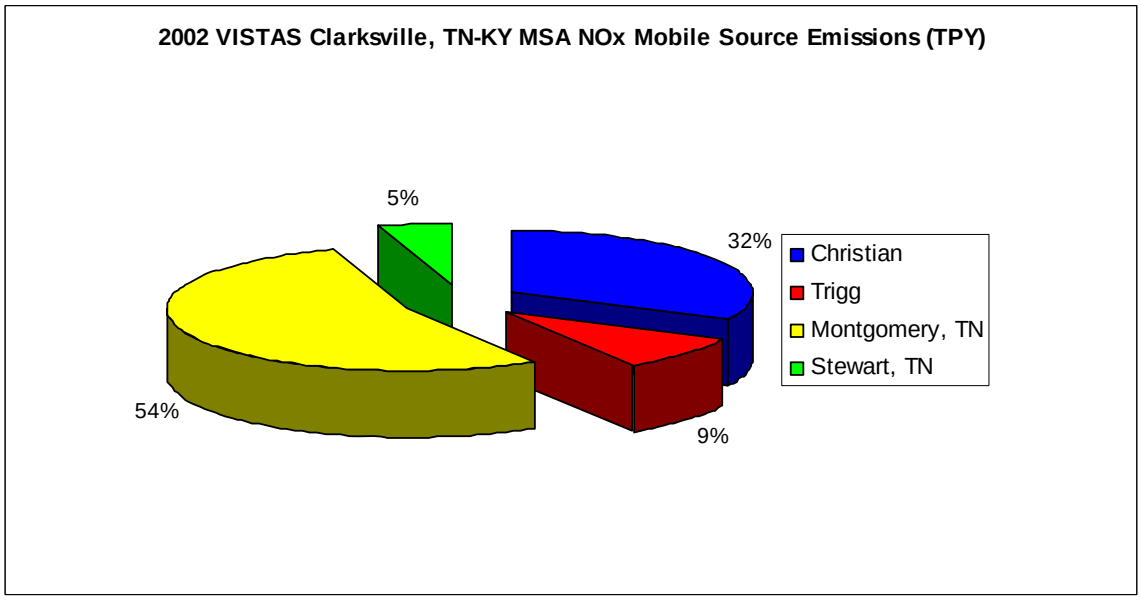
CLK-6


2002 VISTAS VOC Contribution (TPY)
9,000.00
8,000.00
7,000.00
6,000.00
5,000.00
4,000.00
3,000.00
2,000.00
1,000.00
0.00
Christian
Trigg
Montgomery, TN
Stewart, TN
Nonroad
Mobile
Area
Point

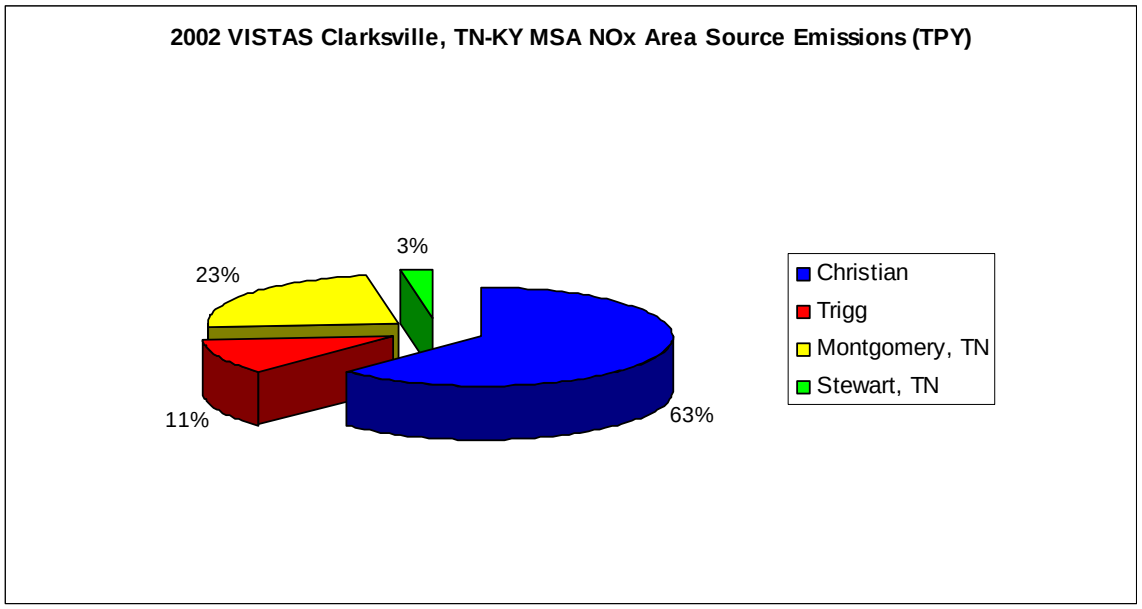
CLK-7


2002 VISTAS Clarksville, TN-KY MSA NOx Point Source Emissions (TPY)
99%
1%
0%
0%
Christian
Trigg
Montgomery, TN
Stewart, TN

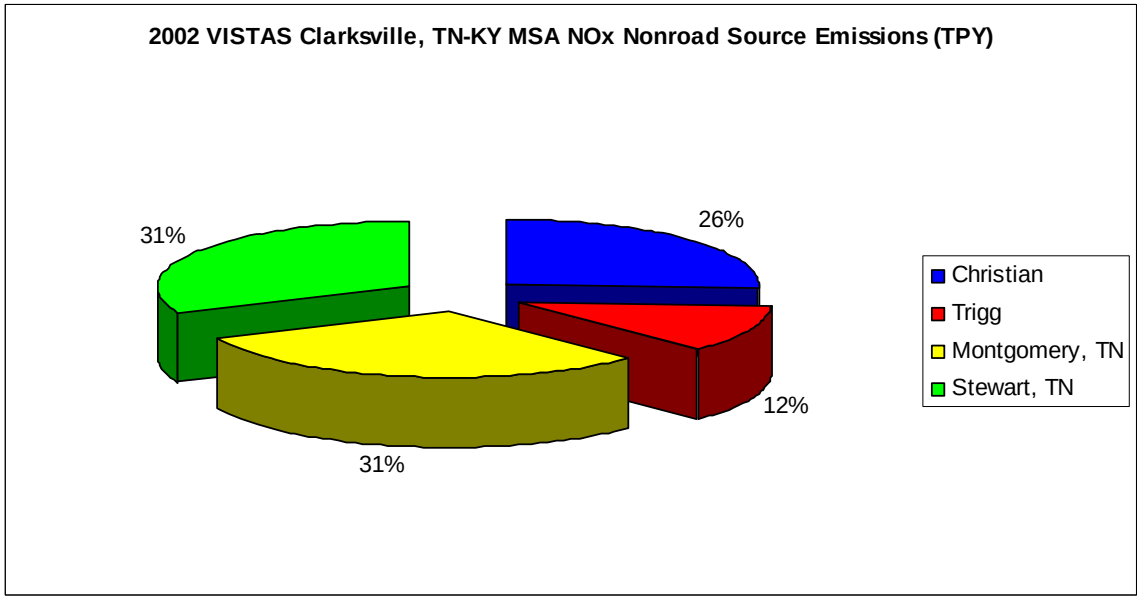
CLK-8


2002 VISTAS Clarksville, TN-KY MSA NOx Mobile Source Emissions (TPY)
5%
32%
54%
9%
Christian
Trigg
Montgomery, TN
Stewart, TN

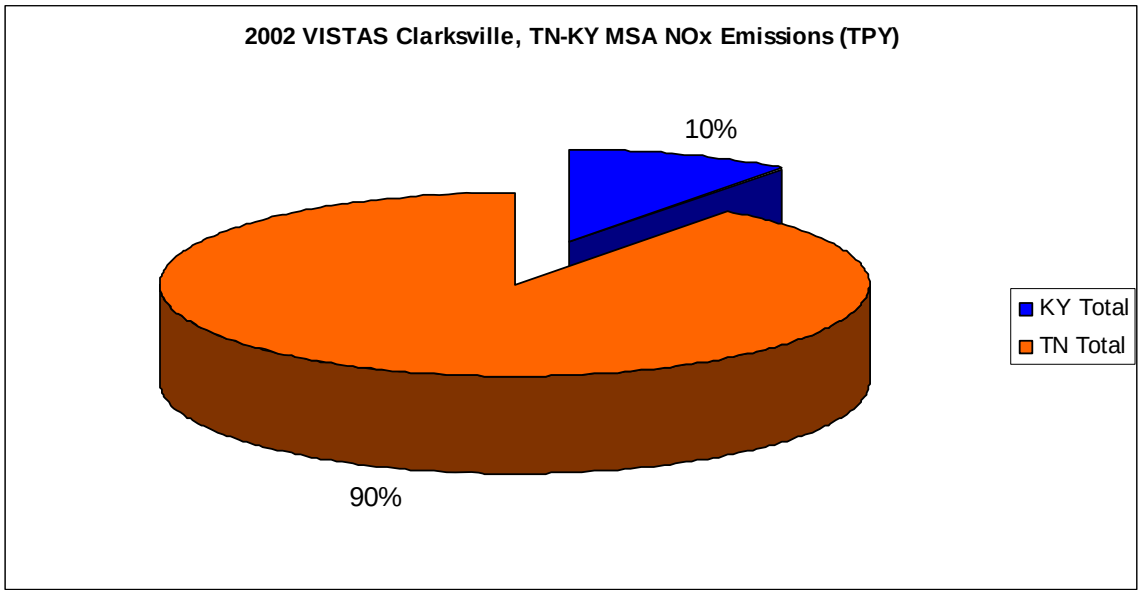
CLK-9


2002 VISTAS Clarksville, TN-KY MSA NOx Area Source Emissions (TPY)
3%
23%
11%
63%
Christian
Trigg
Montgomery, TN
Stewart, TN

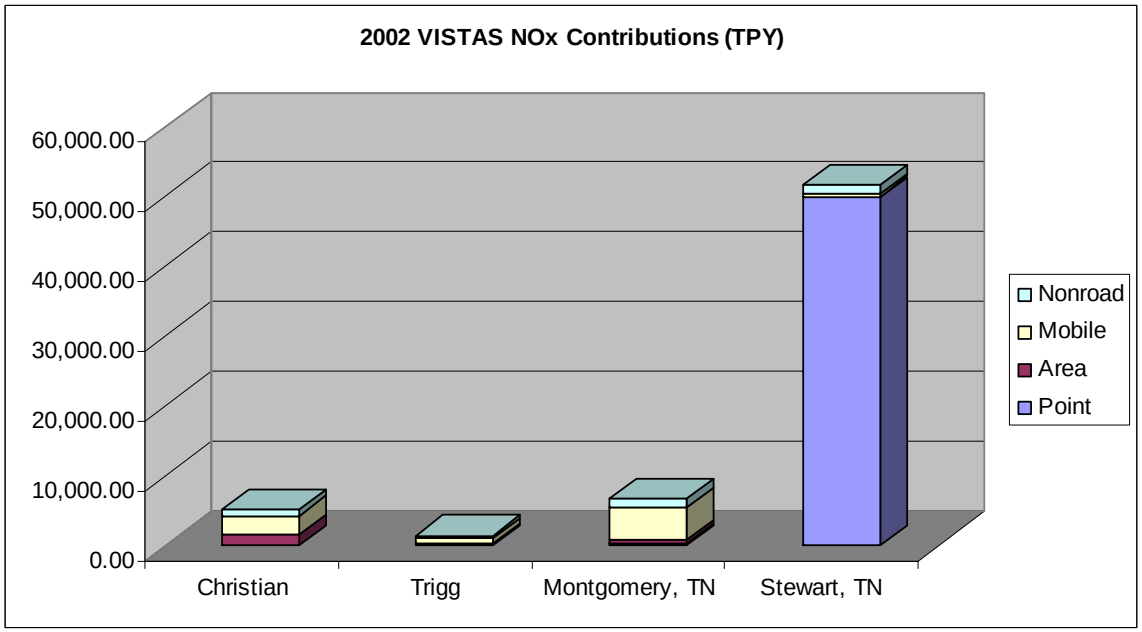
CLK-10


2002 VISTAS Clarksville, TN-KY MSA NOx Nonroad Source Emissions (TPY)
26%
31%
12%
31%
Christian
Trigg
Montgomery, TN
Stewart, TN

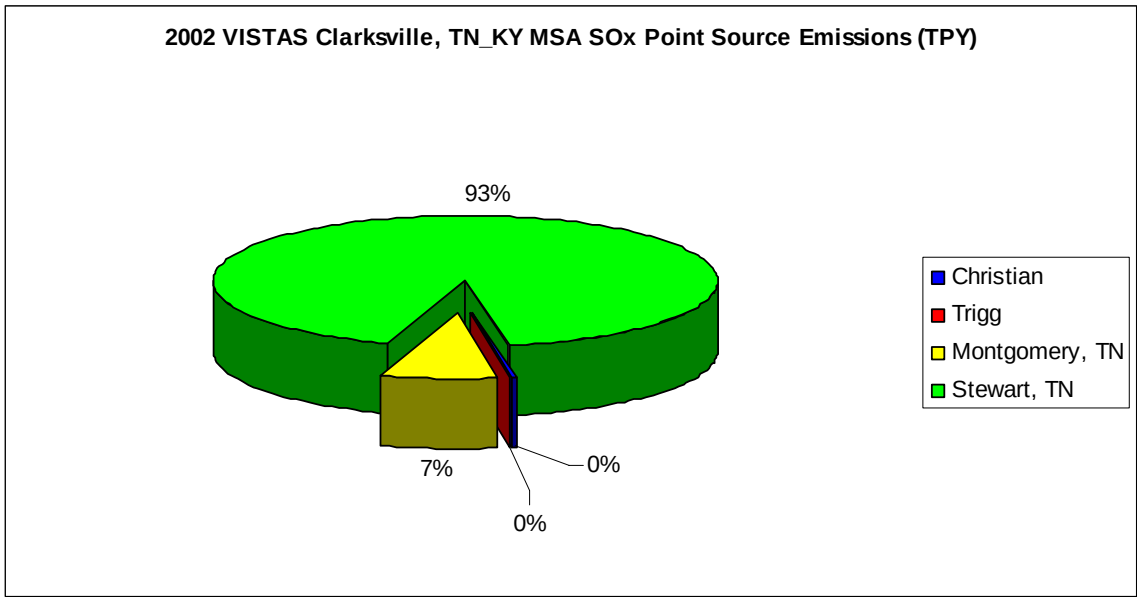
CLK-11


2002 VISTAS Clarksville, TN-KY MSA NOx Emissions (TPY)
10%
90%
KY Total
TN Total

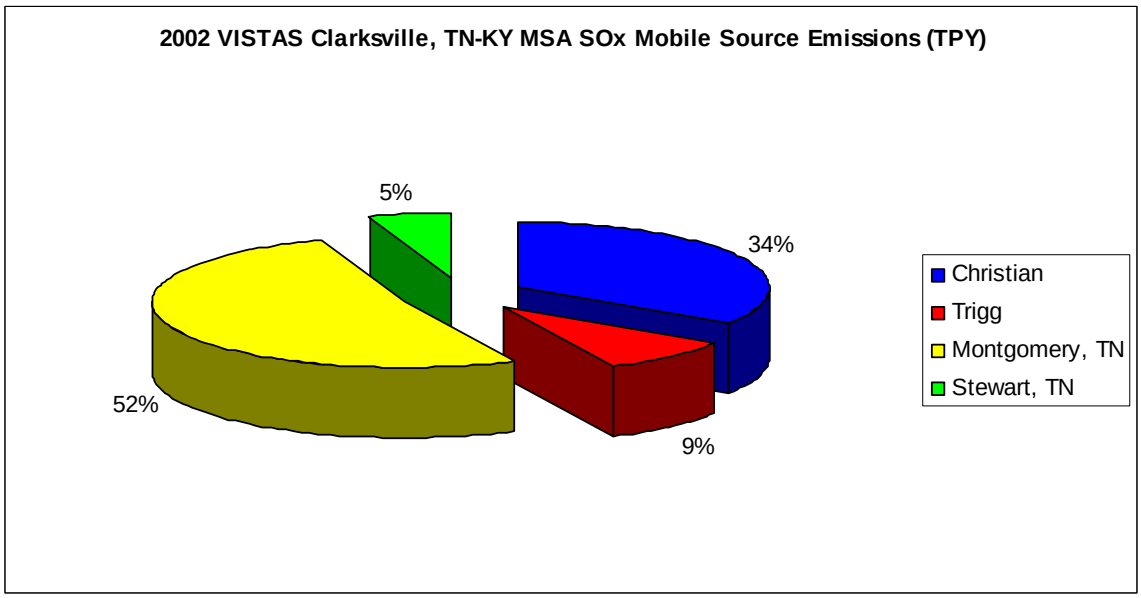
CLK-12


2002 VISTAS NOx Contributions (TPY)
60,000.00
50,000.00
40,000.00
30,000.00
20,000.00
10,000.00
0.00
Christian
Trigg
Montgomery, TN
Stewart, TN
Nonroad
Mobile
Area
Point

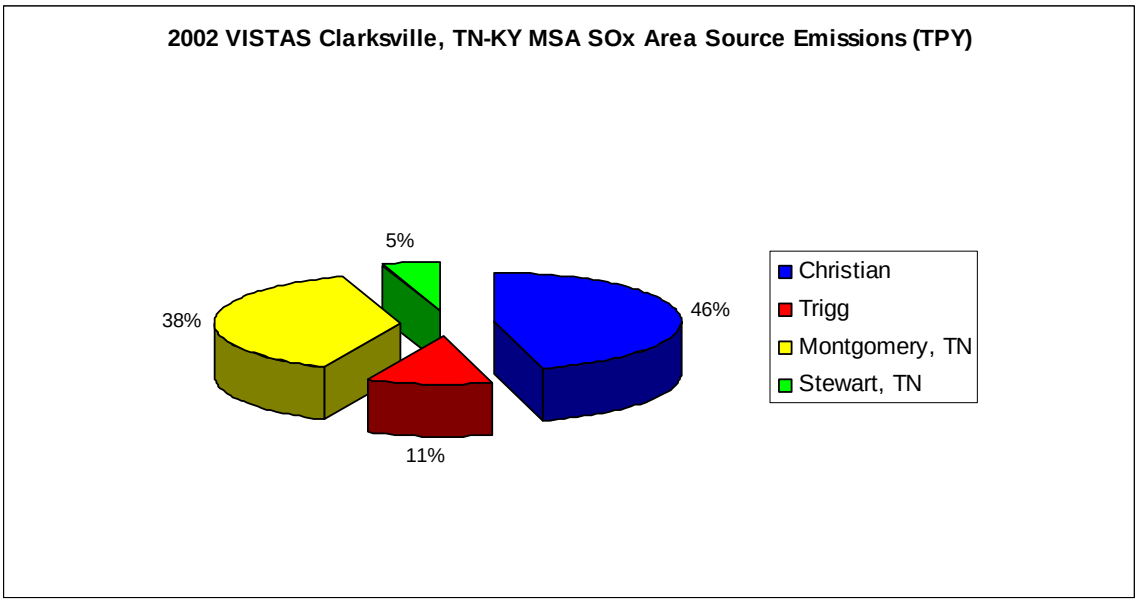
CLK-13


2002 VISTAS Clarksville, TN_KY MSA SOx Point Source Emissions (TPY)
93%
7%
0%
0%
Christian
Trigg
Montgomery, TN
Stewart, TN

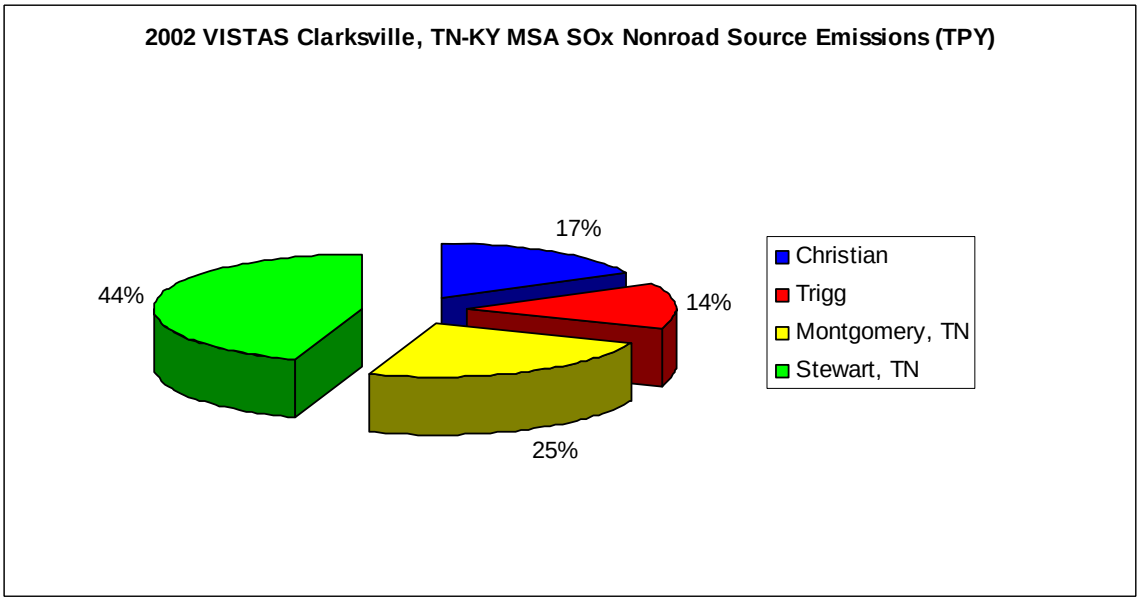
CLK-14


2002 VISTAS Clarksville, TN-KY MSA SOx Mobile Source Emissions (TPY)
5%
34%
52%
9%
Christian
Trigg
Montgomery, TN
Stewart, TN

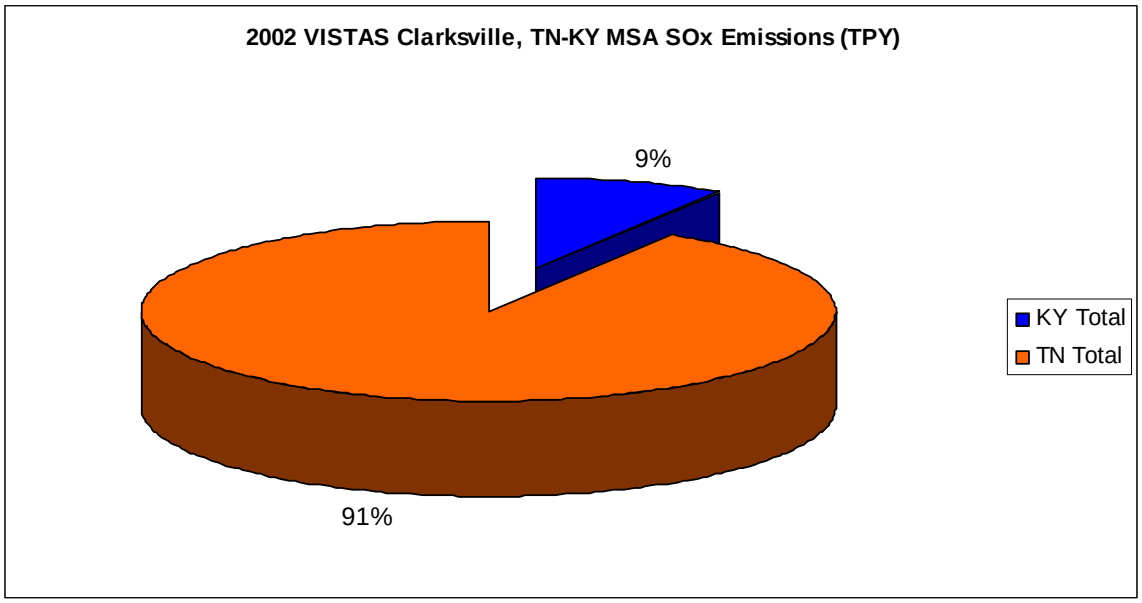
CLK-15


2002 VISTAS Clarksville, TN-KY MSA SOx Area Source Emissions (TPY)
5%
38%
46%
11%
Christian
Trigg
Montgomery, TN
Stewart, TN

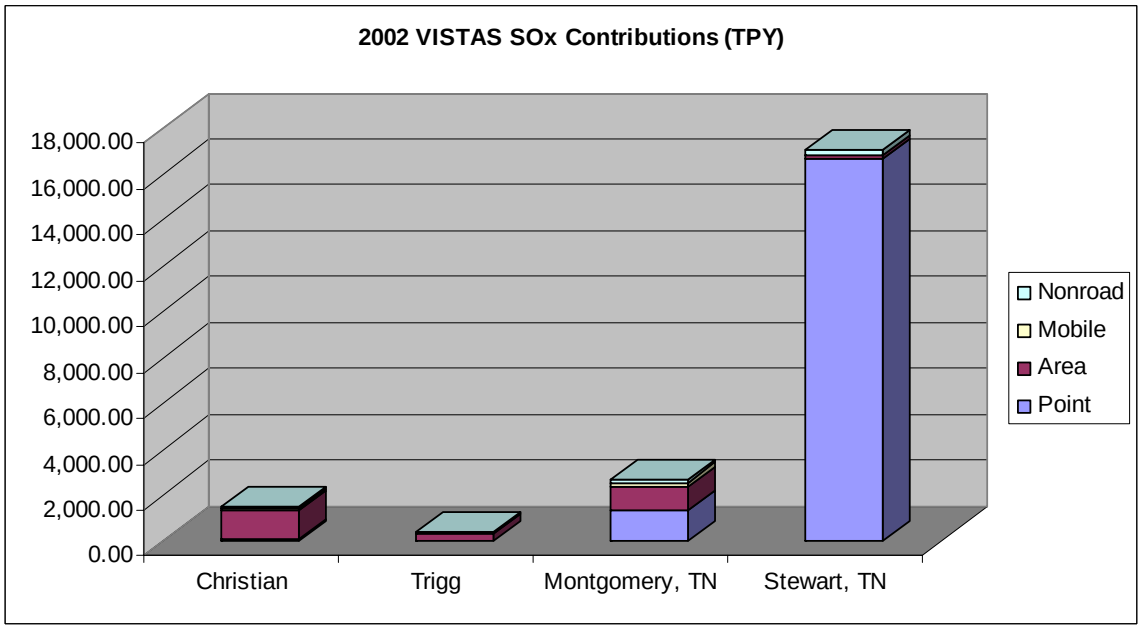
CLK-16


2002 VISTAS Clarksville, TN-KY MSA SOx Nonroad Source Emissions (TPY)
17%
44%
14%
25%
Christian
Trigg
Montgomery, TN
Stewart, TN

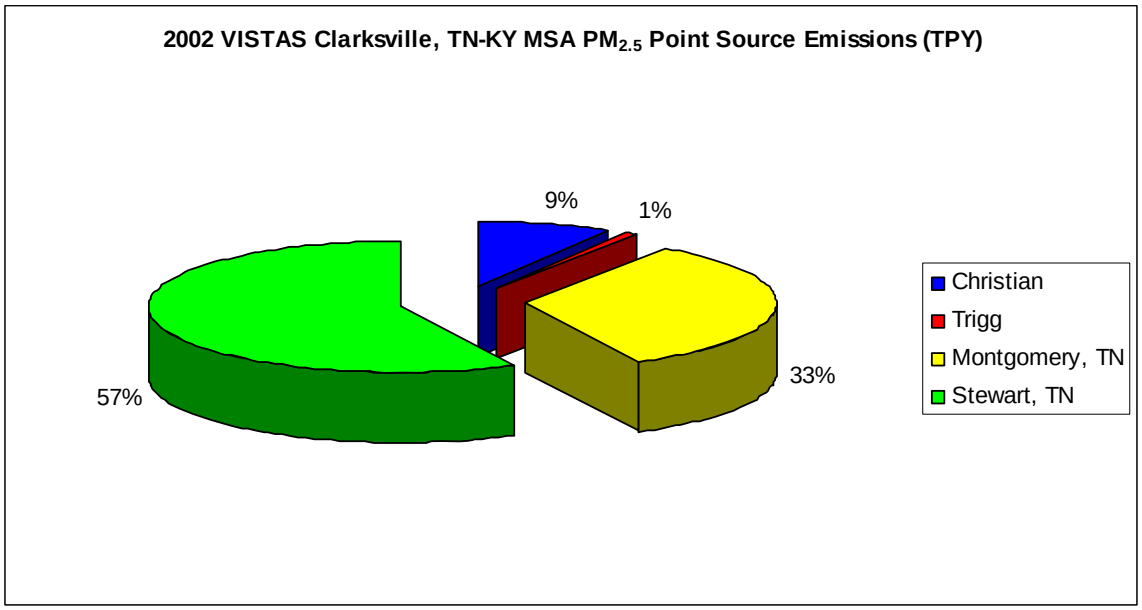
CLK-17


2002 VISTAS Clarksville, TN-KY MSA SOx Emissions (TPY)
9%
91%
KY Total
TN Total

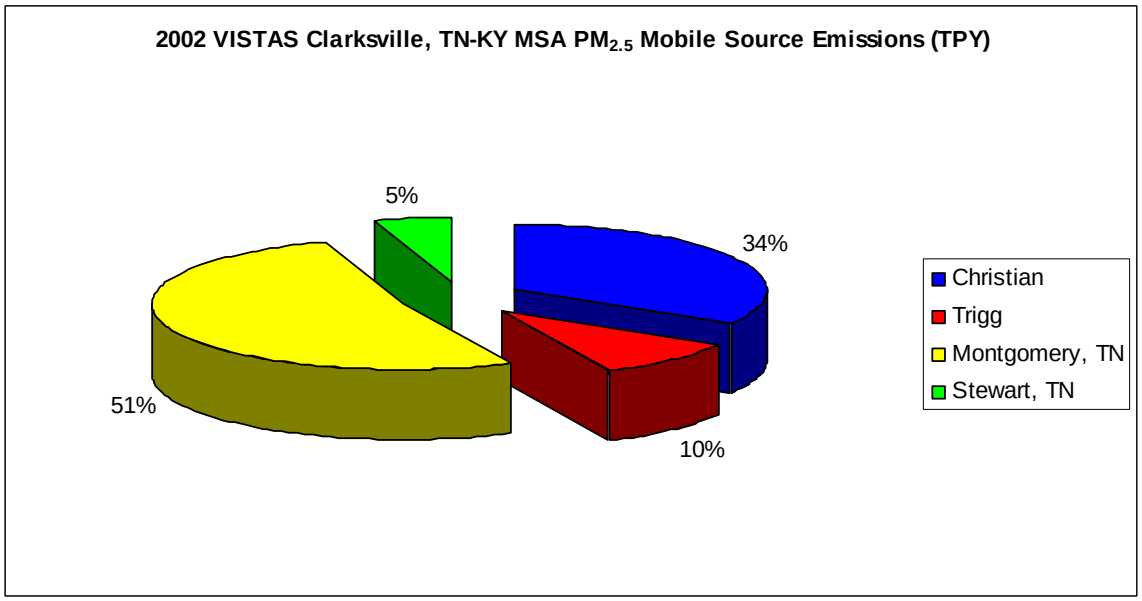
CLK-18


2002 VISTAS SOx Contributions (TPY)
18,000.00
16,000.00
14,000.00
12,000.00
10,000.00
8,000.00
6,000.00
4,000.00
2,000.00
0.00
Christian
Trigg
Montgomery, TN
Stewart, TN
Nonroad
Mobile
Area
Point

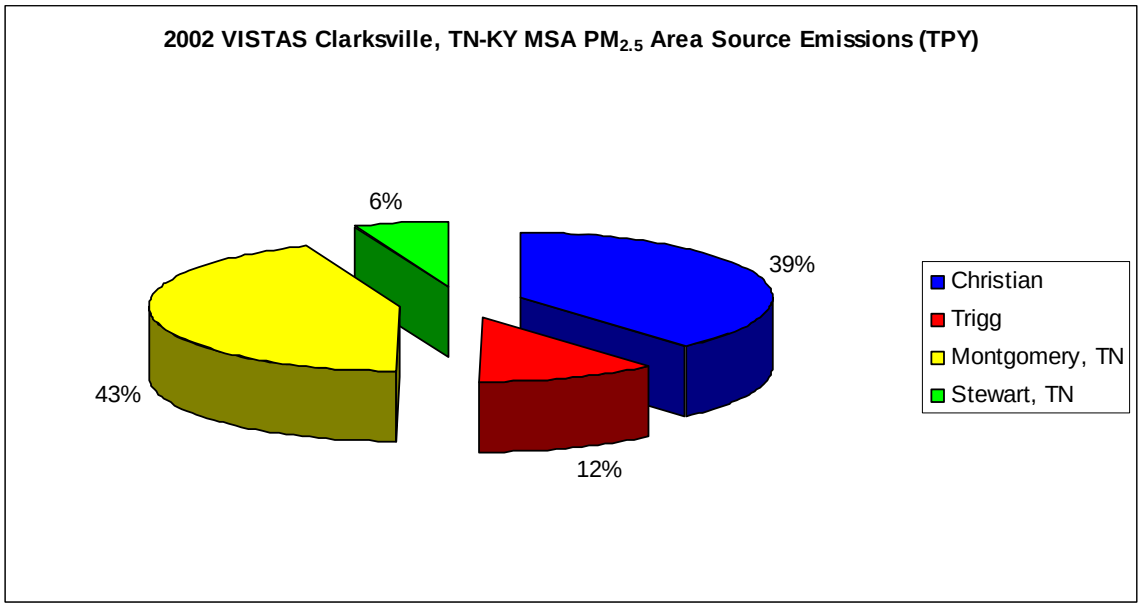
CLK-19


2002 VISTAS Clarksville, TN-KY MSA PM2.5 Point Source Emissions (TPY)
9%
1%
33%
57%
Christian
Trigg
Montgomery, TN
Stewart, TN

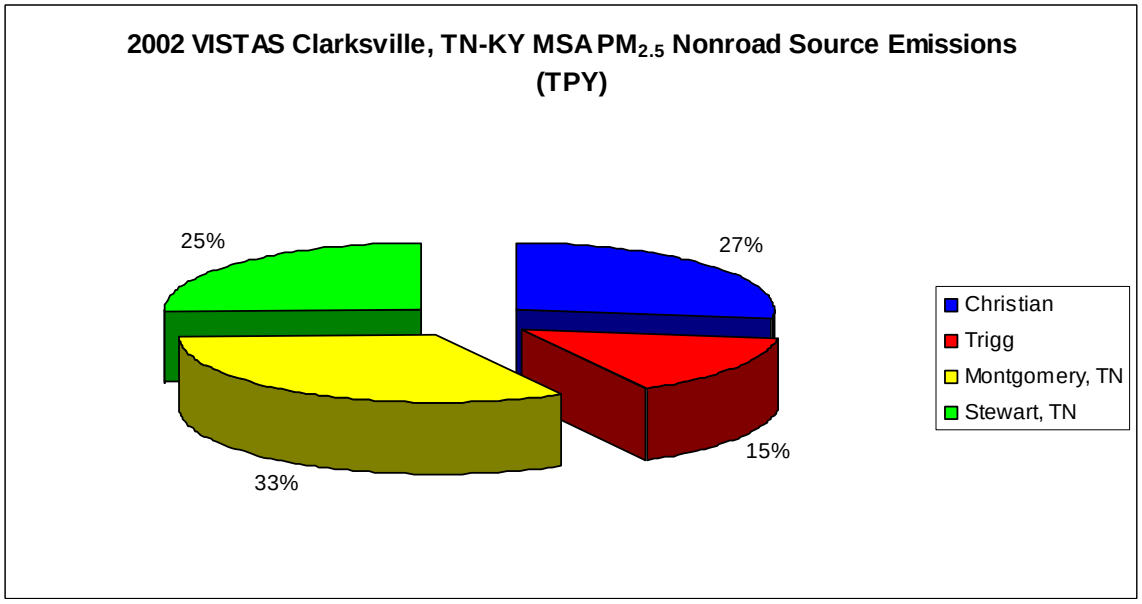
CLK-20


2002 VISTAS Clarksville, TN-KY MSA PM2.5 Mobile Source Emissions (TPY)
5%
34%
51%
10%
Christian
Trigg
Montgomery, TN
Stewart, TN

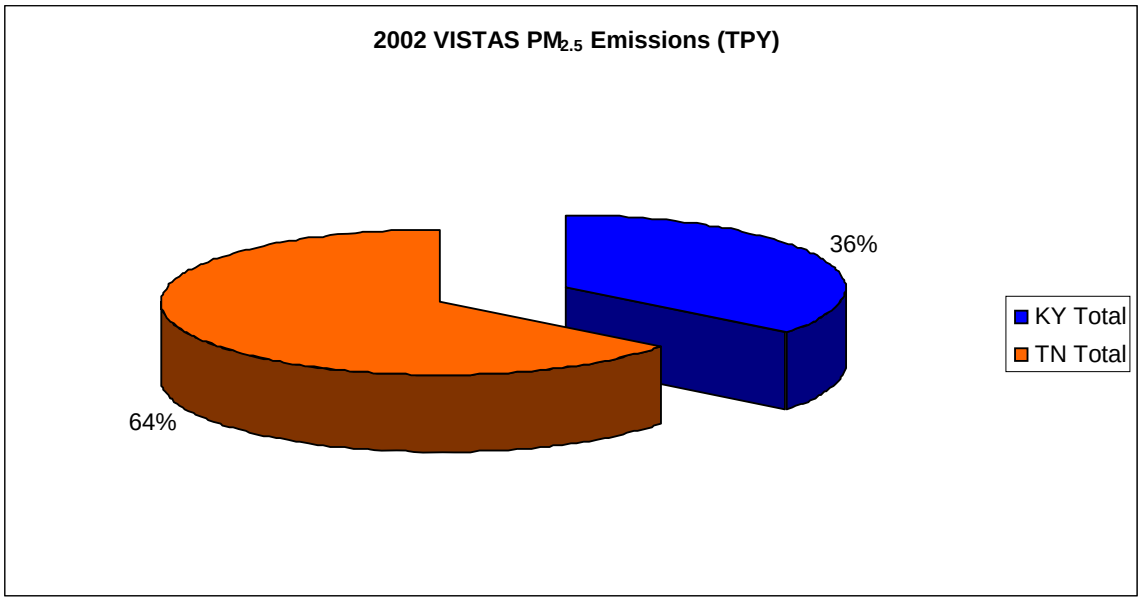
CLK-21


2002 VISTAS Clarksville, TN-KY MSA PM2.5 Area Source Emissions (TPY)
6%
39%
43%
12%
Christian
Trigg
Montgomery, TN
Stewart, TN

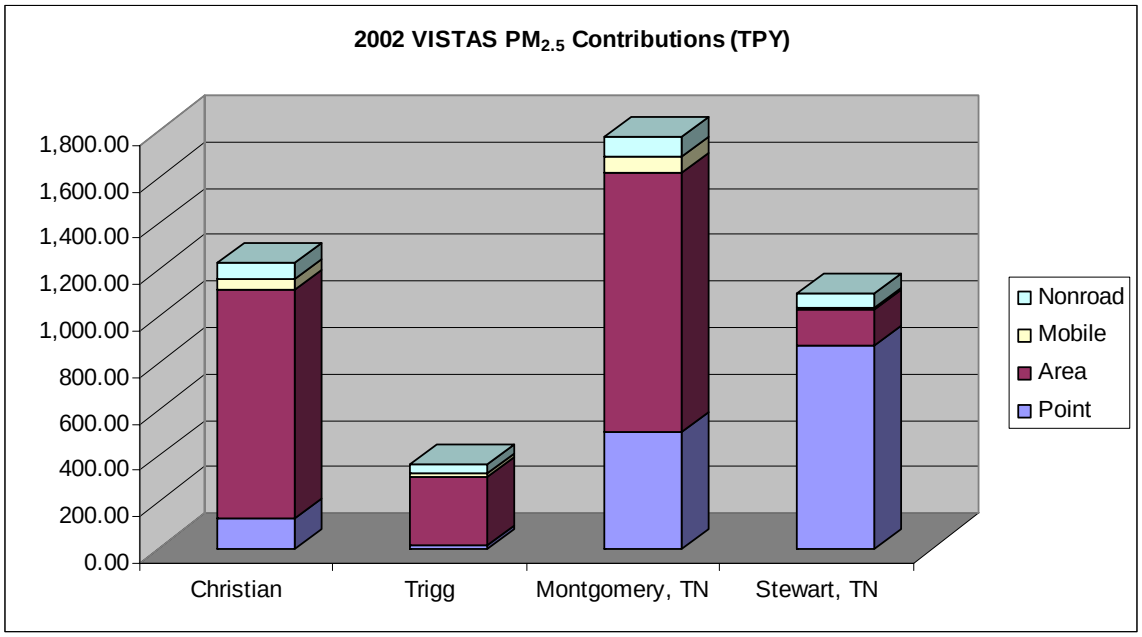
CLK-22


2002 VISTAS Clarksville, TN-KY MSA PM2.5 Nonroad Source Emissions (TPY)
25%
27%
15%
33%
Christian
Trigg
Montgomery, TN
Stewart, TN

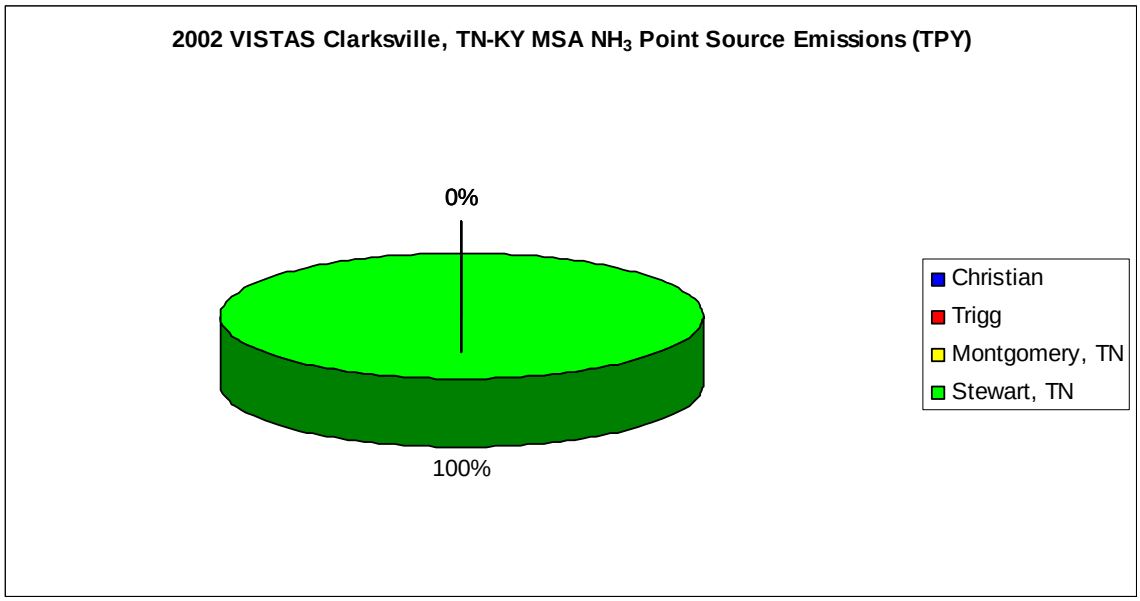
CLK-23


2002 VISTAS PM2.5 Emissions (TPY)
36%
64%
KY Total
TN Total

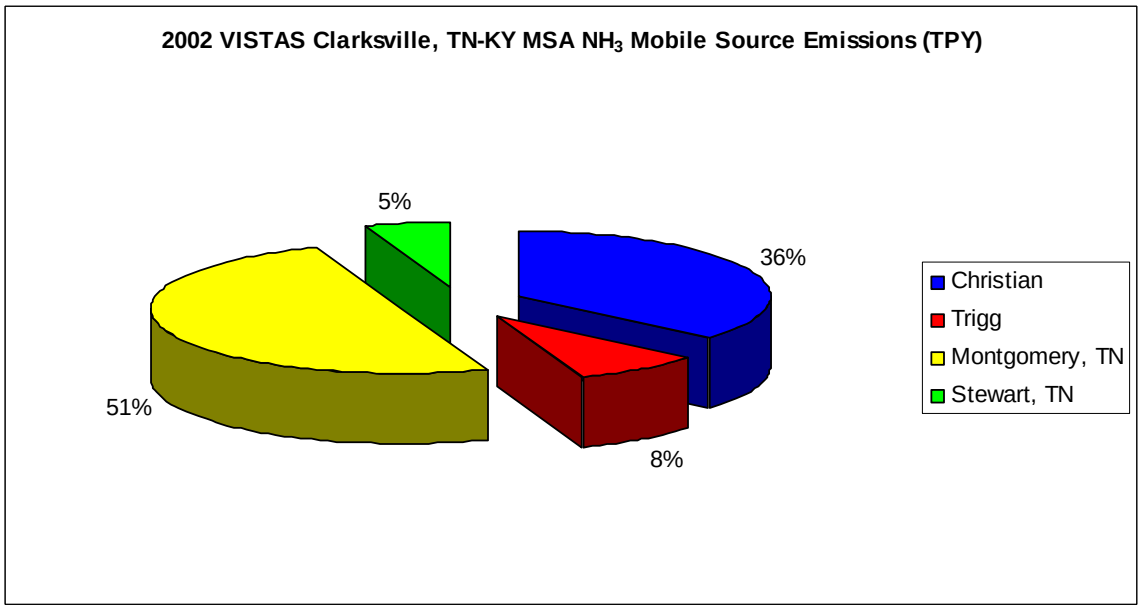
CLK-24


2002 VISTAS PM2.5 Contributions (TPY)
1,800.00
1,600.00
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
Christian
Trigg
Montgomery, TN
Stewart, TN
Nonroad
Mobile
Area
Point

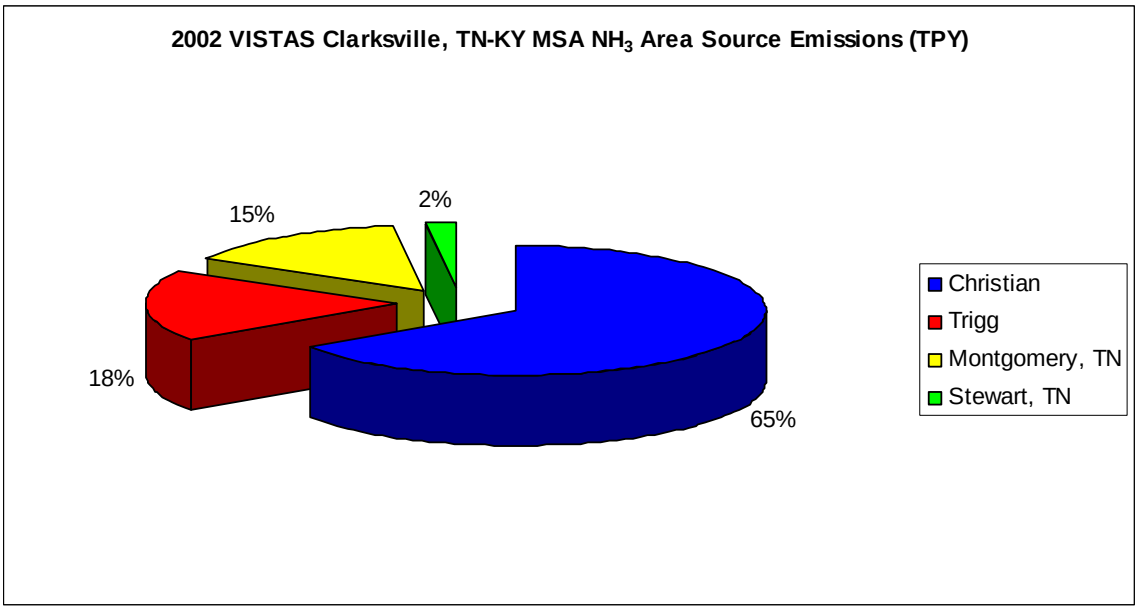
CLK-25


2002 VISTAS Clarksville, TN-KY MSA NH3 Point Source Emissions (TPY)
0%
100%
Christian
Trigg
Montgomery, TN
Stewart, TN

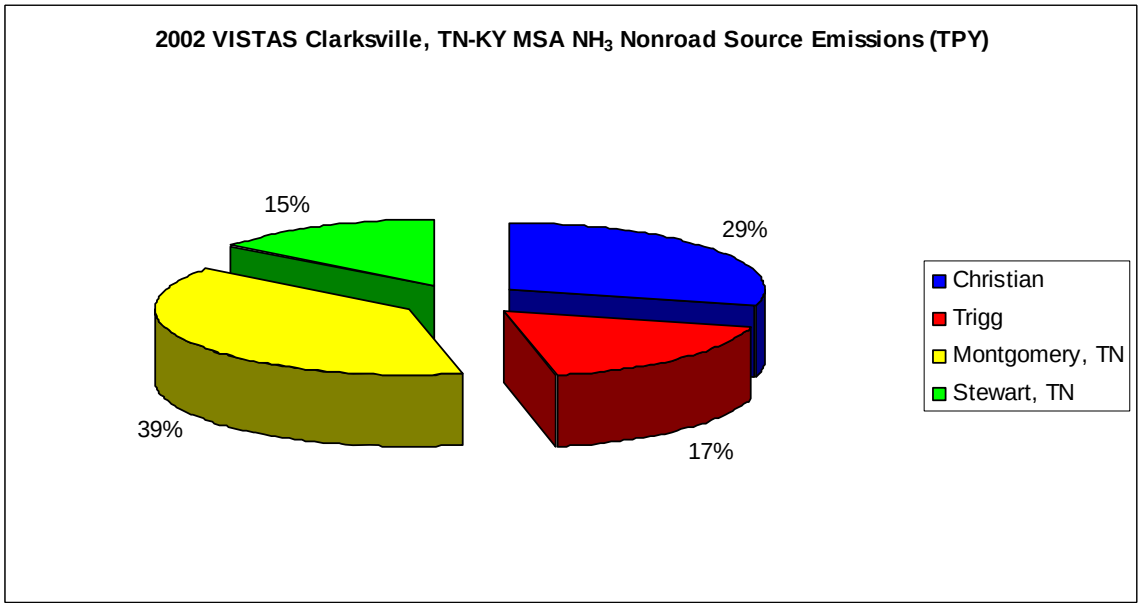
CLK-26


2002 VISTAS Clarksville, TN-KY MSA NH3 Mobile Source Emissions (TPY)
5%
36%
51%
8%
Christian
Trigg
Montgomery, TN
Stewart, TN

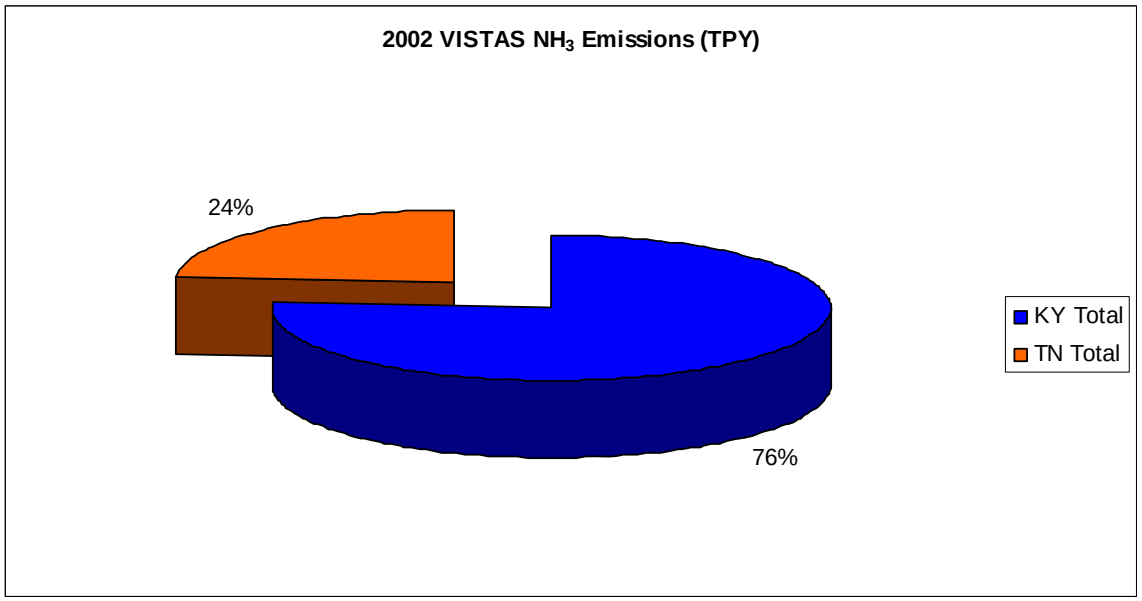
CLK-27


2002 VISTAS Clarksville, TN-KY MSA NH3 Area Source Emissions (TPY)
15%
2%
18%
65%
Christian
Trigg
Montgomery, TN
Stewart, TN

CLK-28


2002 VISTAS Clarksville, TN-KY MSA NH3 Nonroad Source Emissions (TPY)
15%
29%
39%
17%
Christian
Trigg
Montgomery, TN
Stewart, TN

CLK-29


2002 VISTAS NH3 Emissions (TPY)
24%
76%
KY Total
TN Total

CLK-30

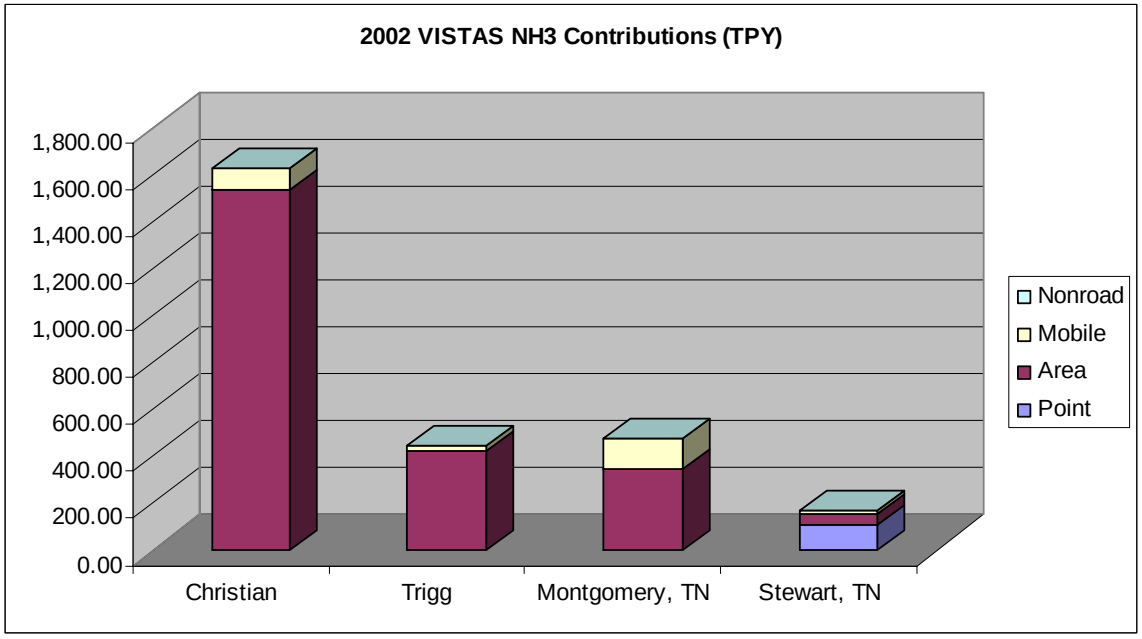

2002 VISTAS NH3 Contributions (TPY)
1,800.00
1,600.00
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
Christian
Trigg
Montgomery, TN
Stewart, TN
Nonroad
Mobile
Area
Point

Table 9.
PM2.5 monitor impacts from the Arkansas and Mississippi Fires in 2005 across the Kentucky areas of evaluation.

2005*						
	State	**County**	**Dates**	**Violating Values (> 35 ug/m3)**	**Top 10 Concentration Days**	**Dates for Exclusion due to Arkansas and Mississippi fires**
	KY	**Bullitt**				9/10/2005
						9/13/2005
21-029-0006	37.985556	-85.713056	6/30/2005	42.4		
			8/11/2005	41.2		**Adjacent Calendar Dates to those requested for exclusion**
			9/10/2005	39.0		9/8/2005
			6/21/2005	35.1		9/9/2005
						9/11/2005
	KY	**Campbell**				9/12/2005
21-037-0003	39.065556	-84.451944	9/10/2005	48.5	4th	
			9/13/2005	39.0		
			8/2/2005	38.0		
			8/11/2005	36.0		
	KY	**Christian**				
21-047-0006	36.911667	-87.323611	9/13/2005	44.9	9th	
			9/10/2005	41.0		
	KY	**Hardin**				
21-093-0006	37.706389	-85.851667	9/10/2005	39.6		
			9/13/2005	39.5		
			6/21/2005	35.1		
	KY	**Jefferson**				
21-111-0043	38.233222	-85.825278	9/9/2005	48.8	3rd	
			9/11/2005	47.8	5th	
			9/10/2005	45.9	8th	
			8/11/2005	44.3		
			9/8/2005	43.5		
			6/30/2005	42.9		
			9/13/2005	42.9		
			8/10/2005	40.9		
			6/25/2005	40.8		
			2/2/2005	40.1		
	KY	**Jefferson**				
21-111-0044	38.190833	-85.780556	9/11/2005	48.9	2nd	
			9/9/2005	44.5	10th	

			9/10/2005	43.2		
			8/11/2005	43.1		
			9/8/2005	41.1		
			8/10/2005	40.7		
			9/13/2005	40.1		
			6/26/2005	39.3		
			2/4/2005	38.5		
			9/12/2005	37.4		
	KY	**Jefferson**				
21-111-0048	38.240556	-85.731667	9/10/2005	46.4	7th	
			8/11/2005	43.6		
			6/30/2005	43.2		
			9/13/2005	41.6		
			7/24/3005	35.2		
	KY	**Jefferson**				
21-111-0051	38.060833	-85.896111	9/13/2005	39.1		
			6/27/2005	36.5		
	KY	**Kenton**				
21-117-0007	39.0725	-84.525000	9/10/2005	52.7	**1st**	
			1/31/2005	46.8	6th	
			9/13/2005	42.1		
			8/2/2005	40.4		
			8/11/2005	36.4		

*From AQS/USEPA AMP440 Maximum Values report for Kentucky in 2005.